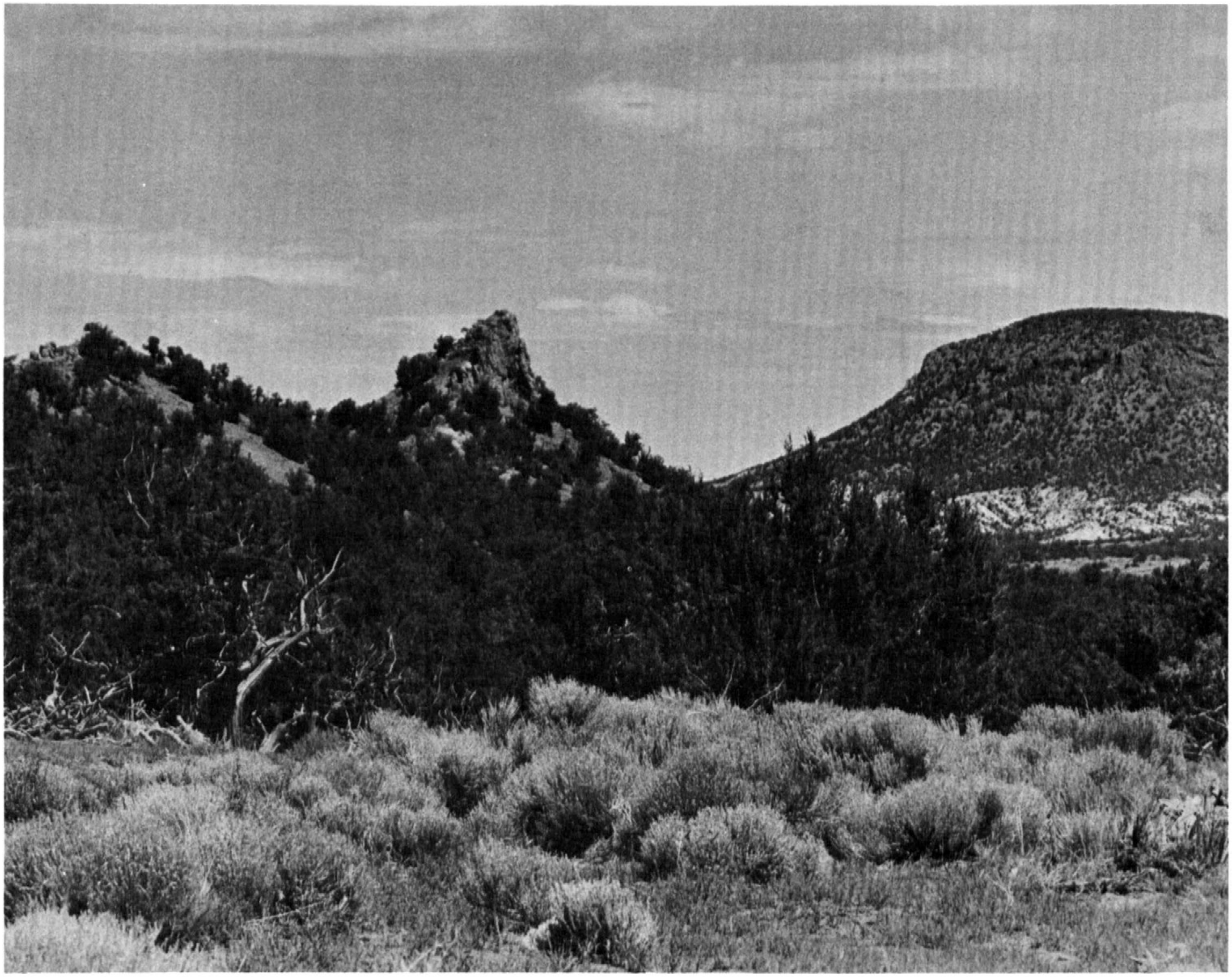
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
United States Department
of the Interior, Bureau of Land
Management, and the New
Mexico Agricultural
Experiment Station

Soil Survey of Catron County, New Mexico,

Northern Part



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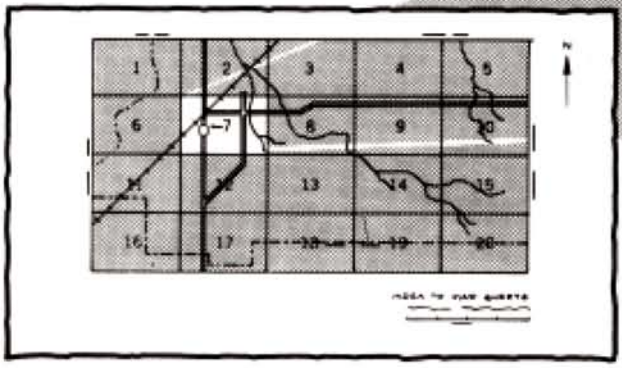

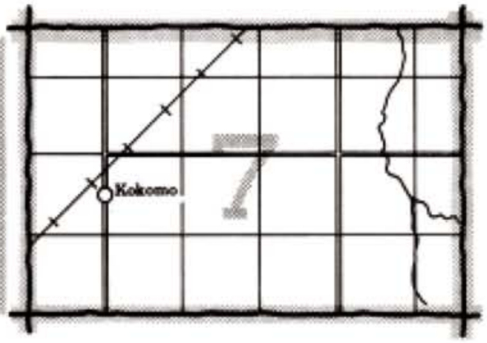

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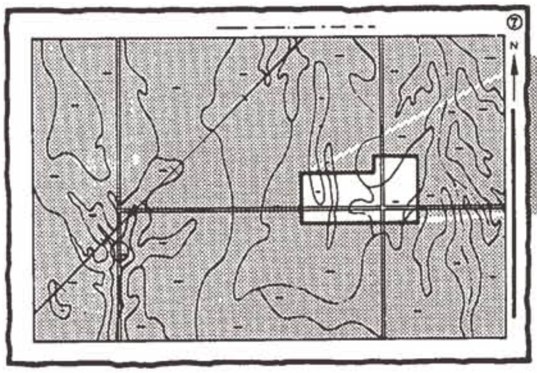

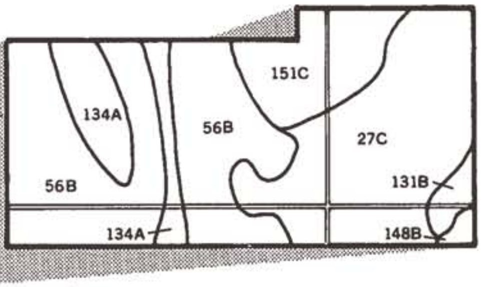

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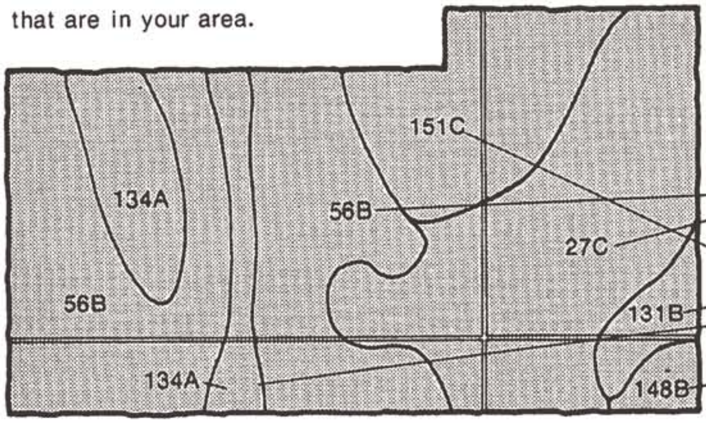

Symbols

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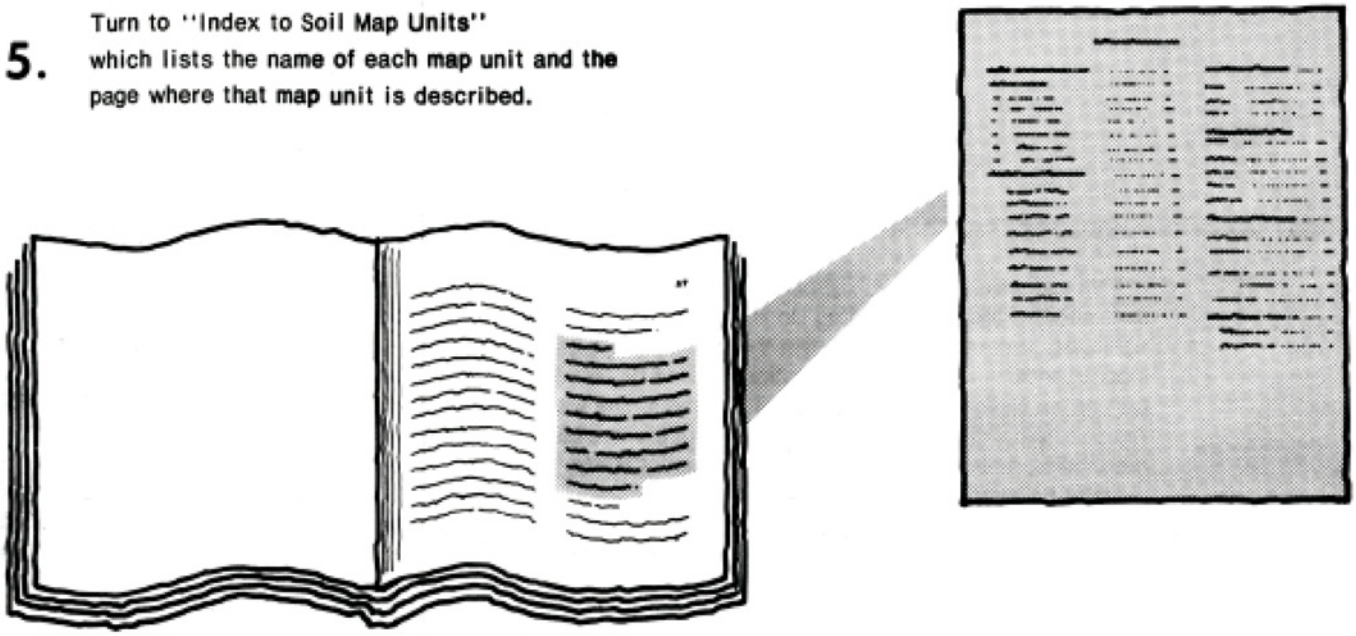
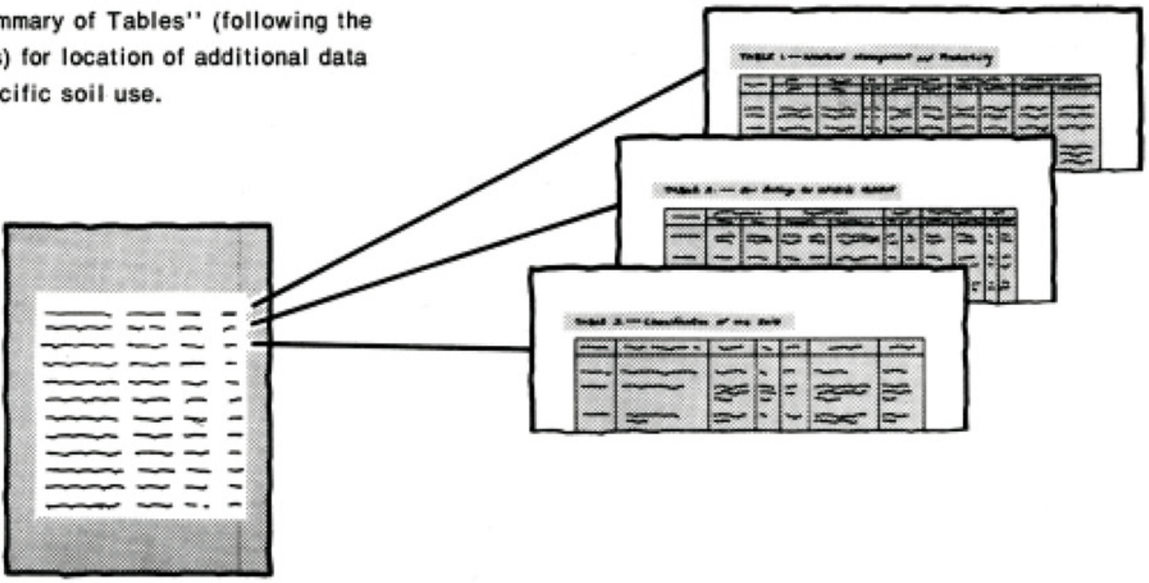
THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1981. Soil names and descriptions were approved in 1982. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. This survey was made cooperatively by the Soil Conservation Service, the United States Department of the Interior, Bureau of Land Management, and the New Mexico Agricultural Experiment Station. It is part of the technical assistance furnished to the Quemado, Salado, San Francisco, and Sierra Soil and Water Conservation Districts.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Area of Ustic Torriorthents-Rock outcrop-Badland complex, 20 to 100 percent slopes.

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Foreword

This soil survey contains information that can be used in land-planning programs in Catron County, New Mexico, Northern Part. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey soils are poorly suited to use as septic tank absorption fields.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Ray T. Margo Jr.

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State Conservationist
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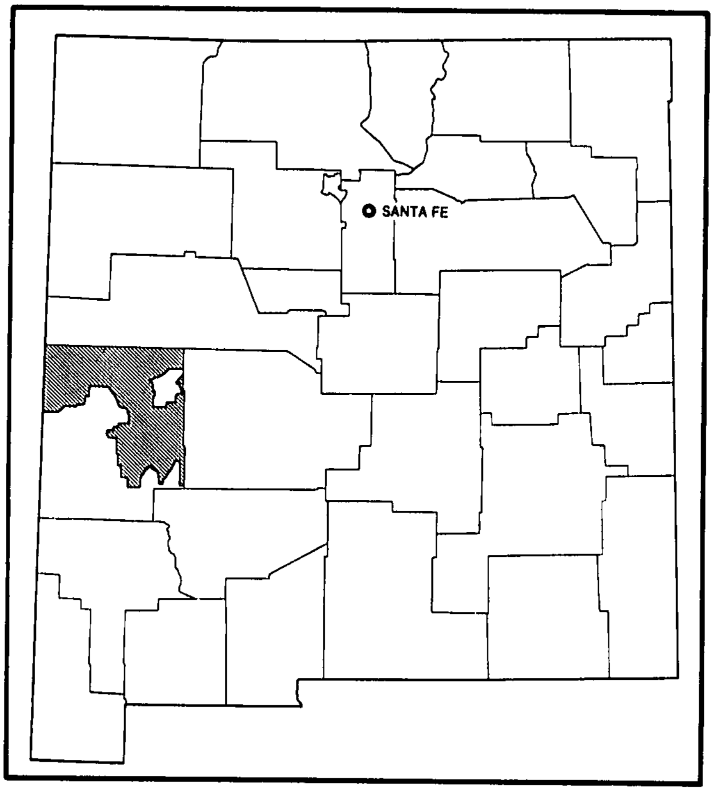

Location of Catron County, Northern Part, in New Mexico.

Soil Survey of
Catron County, New Mexico, Northern Part

By W. Ralph Johnson, Soil Conservation Service

Fieldwork by W. Ralph Johnson, Terry E. Hilley, Joseph V.
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Soil Conservation Service, and
Harold G. Wall, Clement L. Chastain, Cheryl L. Roy, Carol E.
Marchio, and Paul J. Meyer, Bureau of Land Management

United States Department of Agriculture,
Soil Conservation Service
In cooperation with
United States Department of the Interior,
Bureau of Land Management, and
the New Mexico Agricultural Experiment Station

CATRON COUNTY, NORTHERN PART, is in the west-central part of New Mexico. It has an area of 2,216,332 acres, or about 3,463 square miles. Three small communities Datil, Pie Town, and Quemado are within the survey area. Reserve, the county seat of Catron County, is outside the survey area. Two highways, U.S. 12 and U.S. 60, traverse the area.

The Zuni Salt Lake, the largest body of water in the survey area, does not provide potable water because it is high in content of salt. No perennial streams are within the survey area.

Elevation in the area ranges from about 6,000 feet where Carrizo Creek crosses the state line to about 10,250 feet atop Allegros Mountain in the center of the survey area.

Livestock grazing is the principal land use in the survey area. Exploration for energy is in progress throughout the area.

The survey area extends from the Arizona-New Mexico state line east to the Socorro County line. It is bounded on the north by Cibola County and on the south by the Apache and Gila National Forests.

Descriptions, names, and delineations of soils in this survey area do not fully agree with those of Apache County, Arizona, and the Apache, Cibola, and Gila National Forests. This is the result of better concepts of soil classification, changes in series concepts, different needs and uses, and the time of the soil survey work.

Climate

By Frank Houghton, climatologist for New Mexico, National Weather Service, U.S. Department of Commerce.

The climate varies considerably between localities within the survey area because of extremes in elevation and topography. Average annual precipitation ranges from about 9 inches in the drier localities to 20 inches or more in the high mountains, which peak at more than 10,000 feet. Annual precipitation generally increases by about 4 inches for each 1,000-foot increase in elevation. In the northern part of the county, small areas that are somewhat shielded by mountains to both the east and west receive as little as 9 inches of precipitation.

Winter is the driest season. Much of the moisture moving inland from Pacific Ocean storms is removed over the mountains to the west. The area west of the Continental Divide has less seasonal difference than does the area to the east. The main source of moisture in summer is the Gulf of Mexico. Moist air enters New Mexico in the general circulation from the southeast about the westward-displaced Bermuda high pressure area. About two-thirds of the annual precipitation falls during the warmer 6 months of the year, and half of the annual average precipitation falls from July through September. This is mostly from brief, but often heavy, thunderstorms.

The average number of days with precipitation of 0.10 inch or more is 23 at Quemado, and most other localities have 30 or more. The average number of days with precipitation of 0.50 inch or more is 3 at Quemado and 5 for the entire survey area. Amounts vary widely from year to year and month to month.

Patterns of temperature and precipitation at Luna Ranger Station are shown in table 1. Although the Luna Ranger Station is outside the survey area, these patterns generally are representative of other localities in the area except for variations caused by extreme elevations and topographic effects.

Few days fail to have above-freezing temperatures, and few days at the lower elevations have temperatures of zero or lower.

The frost-free period is June to late in September, or about 120 days, in most of the county; however, it is more nearly 90 days in the mountains above 7,000 feet and more nearly 180 days (from May to late in October) at the lower elevations of the south.

Mean annual sunshine ranges from 3,200 hours in the north to about 3,600 hours in the south, or 70 to 80 percent of the possible time. It is fairly evenly distributed throughout the year. Relative humidity is moderately low, considering the lower mean temperatures resulting from the high elevation of the area. It ranges from 70 percent early in the morning to about 37 percent in the afternoon and averages as low as 16 percent in the afternoon in June.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge gradually into one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While the soil survey was in progress, samples of some of the soils in the area were collected for laboratory analyses and for engineering tests (*11*). Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses and under different levels of management. Some interpretations were modified to fit local conditions, and some new interpretations were developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The soils or miscellaneous areas making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils or miscellaneous areas can be identified on the map. Likewise, areas that are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a ranch or pasture or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Map Unit Descriptions

1. Catman-Manzano-Hickman

Deep, well drained, level to sloping soils; in swales, drainageways, and playas

This map unit is throughout the survey area. Slope is mainly 0 to 5 percent but ranges to 7 percent. The vegetation on this unit is grasses and shrubs. Elevation is mainly 6,000 to 7,600 feet but ranges to 7,800 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit makes up 13 percent of the survey area. It is about 42 percent Catman and similar soils, 22 percent Manzano and similar soils, and 17 percent Hickman and similar soils. The remaining 19 percent is components of minor extent.

Catman soils are in drainageways, swales, and playas. These soils are deep, well drained, and slowly permeable. They formed in fine textured alluvium. The surface layer is pale brown clay about 3 inches thick. Below this to a depth of 60 inches or more is pale brown, stratified silty clay loam, clay loam, silty clay, clay, and silt loam. Some areas of these soils are slightly to strongly affected by salts and alkali.

Manzano soils are in swales. These soils are deep, well drained, and moderately slowly permeable. They formed in alluvium. The surface layer is brown loam about 2 inches thick. The subsoil is dark brown and brown clay loam and loam. Below this to a depth of 60 inches or more is pale brown loam.

Hickman soils are in swales. These soils are deep, well drained, and moderately slowly permeable. They formed in alluvium. The surface layer is brown loam about 3 inches thick. Below this to a depth of 60 inches or more the soils are brown and pale brown, stratified clay loam, sandy clay loam, loam, and sandy loam.

Of minor extent in this unit are Dioxice soils on alluvial fans and ridges and Guy soils on plains and hills. Most areas of this unit are subject to rare, occasional, or frequent flooding for brief periods during prolonged, high-intensity storms.

This unit is used for livestock grazing and wildlife habitat.

This low-lying grassland unit supports a wildlife community that includes pronghorn antelope, coyote, black-tailed jackrabbit, spotted ground squirrel, banner-tailed kangaroo rat, Botta's pocket gopher, silky pocket mouse, sparrow hawk, meadowlark, horned lark, western spadefoot toad, leopard lizard, and prairie rattlesnake.

2. Cabezon-Datil-Hubbell

Shallow and deep, well drained, sloping to steep soils; mainly on mesas, hills, and alluvial fans

This map unit is in the western half of the survey area. It is characterized by ridges, hills, mesas, alluvial fans, and plains associated with volcanic activity (fig. 1). Slope is mainly 1 to 25 percent but ranges to 50 percent. Vegetation on this unit is mainly grass and scattered stands of pinyon and juniper. Elevation is mainly 6,200 to 8,000 feet but ranges to 8,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit makes up about 10 percent of the survey area. It is about 31 percent Cabezon and similar soils, 26 percent Datil and similar soils, and 15 percent Hubbell and similar soils. The remaining 28 percent is components of minor extent.

Cabezon soils are on hills, mesas, and ridges associated with basalt flows. These soils are shallow,

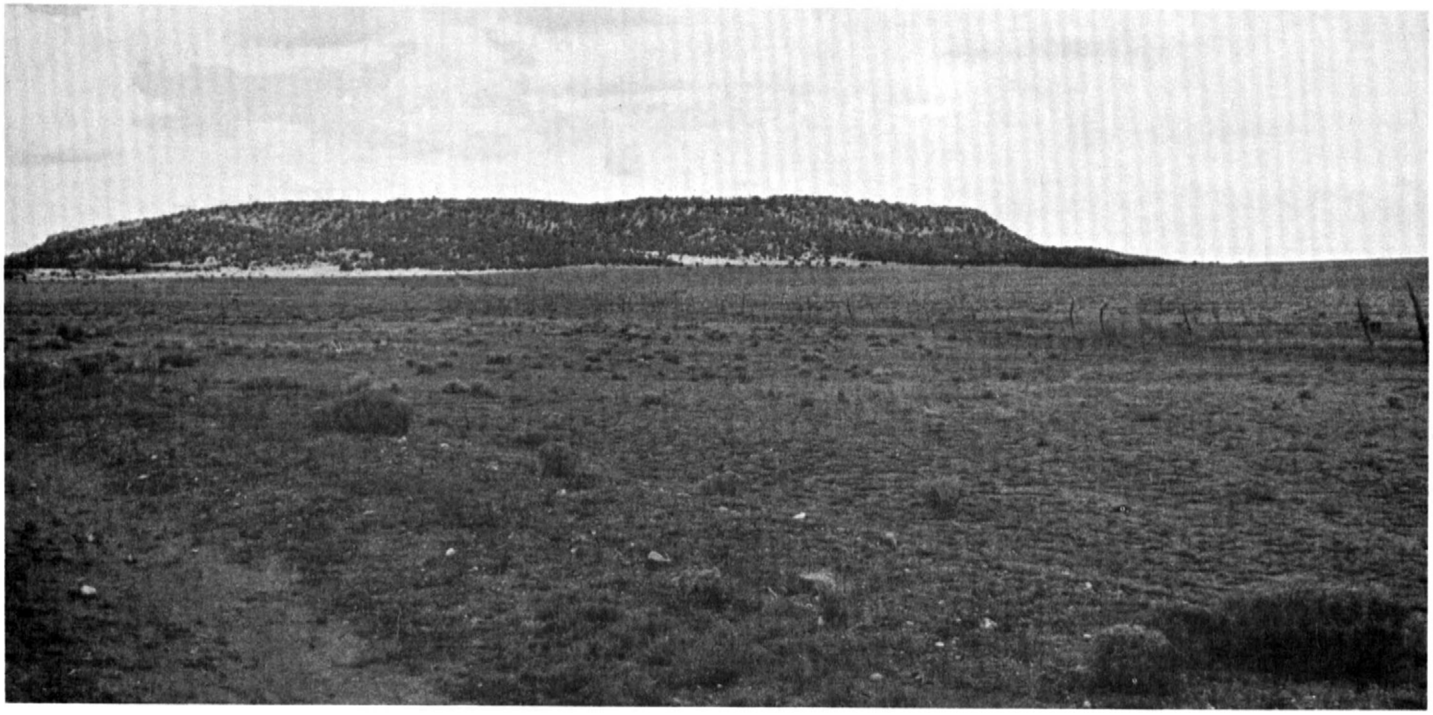

Figure 1. Typical area of general map unit 2. Mesa Parada, a local landmark, is in background.

well drained, and slowly permeable. They formed in residuum derived dominantly from volcanic material. The surface layer is dark brown cobbly clay loam about 4 inches thick. The subsoil is reddish brown clay about 15 inches thick. Unweathered basalt is at a depth of 19 inches.

Datil soils are on plains, ridges, and alluvial fans. These soils are deep, well drained, and moderately permeable. They formed in alluvium. The surface layer is brown fine sandy loam about 3 inches thick. The subsoil is brown loam and gravelly clay loam about 19 inches thick. Below this to a depth of 60 inches or more is pinkish gray loam and gravelly sandy clay loam.

Hubbell soils are on alluvial fans near the Zuni Salt Lake. These soils are deep, well drained, and moderately rapidly permeable. They formed in material derived dominantly from volcanic ash and cinders. The surface layer is grayish brown loamy sand about 4 inches thick. Below this to a depth of 60 inches or more is pale brown, light gray, and grayish brown, stratified loamy sand, sandy loam, or loam.

Of minor extent in this unit are Celsosprings soils on alluvial fans and mesas and Rock outcrop associated with the Cabezon soils.

This unit is used for livestock grazing and wildlife habitat.

The grassland areas of this unit support a wildlife community that includes pronghorn antelope, coyote, desert cottontail, spotted ground squirrel, Botta's pocket gopher, Gunnison's prairie dog, silky pocket mouse, horned lark, meadowlark, lark bunting, loggerhead shrike, side-blotched lizard, and prairie rattlesnake. In the pinyon and juniper areas of this unit, mule deer, gray fox, porcupine, chipmunk, pinyon mouse, white-throated woodrat, pinyon jay, scrub jay, northern plateau lizard, and black-tailed rattlesnake characterize the wildlife community.

3. Celacy-Datil-Typic Ustorthents

Shallow to deep, well drained, sloping to steep soils; mainly on plains, alluvial fans, and hills

This map unit is in the northwestern part of the survey area. Slope is mainly 1 to 25 percent but ranges to 100 percent. The vegetation on this unit is mainly grass and scattered shrubs. Elevation is mainly 6,300 to 7,800 feet but ranges from 6,000 to 8,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit makes up about 14 percent of the survey area. It is about 27 percent Celacy and similar soils, 25 percent Datil and similar soils, and 18 percent Typic Ustorthents and similar soils. The remaining 30 percent is components of minor extent.

Celacy soils are on plains, mesas, and ridges. These soils are moderately deep, well drained, and moderately permeable. They formed in residuum derived dominantly from interbedded sandstone and shale. The surface layer is light yellowish brown fine sandy loam about 3 inches thick. The upper 5 inches of the subsoil is dark yellowish brown fine sandy loam, and the lower 14 inches is yellowish brown sandy clay loam. Below this to a depth of 28 inches is light yellowish brown fine sandy loam. Weathered soft bedrock is at a depth of 28 inches.

Datil soils are on alluvial fans and upland plains. These soils are deep, well drained, and moderately permeable. They formed in alluvium. The surface layer is brown fine sandy loam about 3 inches thick. The subsoil is brown loam and gravelly clay loam about 19 inches thick. Below this to a depth of 60 inches or more is pinkish gray loam and gravelly sandy clay loam.

Typic Ustorthents are on hills, alluvial fans, and upland plains. These soils are shallow to deep, well drained, and slowly to rapidly permeable. They formed in alluvium. The surface layer is brown fine sandy loam about 2 inches thick. Below this to a depth of 34 inches the soils are light brownish gray and light gray loam or fine sandy loam. Weakly cemented volcanic debris is at a depth of 34 inches.

Of minor extent in this unit are Mion and Travessilla soils on ridges and hills and Rock outcrop throughout the unit.

This unit is used for livestock grazing and wildlife habitat.

The grassland part of this unit supports a wildlife community that includes pronghorn antelope, coyote, desert cottontail, spotted ground squirrel, Botta's pocket gopher, Gunnison's prairie dog, silky pocket mouse, horned lark, meadowlark, lark bunting, loggerhead shrike, side-blotched lizard, and prairie rattlesnake.

In the pinyon and juniper areas of the unit, mule deer, gray fox, porcupine, chipmunk, pinyon mouse, white-throated woodrat, pinyon jay, scrub jay, northern plateau lizard, and black-tailed rattlesnake characterize the wildlife community.

4. Flugle-Loarc-Typic Ustorthents

Shallow to deep, well drained, level to steep soils; on alluvial fans, hills, and ridges

This map unit is in the north-central part of the survey area. Slope is mainly 0 to 25 percent but ranges to 100 percent. The vegetation on this unit is mainly pinyon, juniper, and grass. Elevation is mainly 6,300 to 8,100 feet but ranges from 6,000 to 8,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit makes up about 18 percent of the survey area. It is about 27 percent Flugle and similar soils, 26 percent Loarc and similar soils, and 17 percent Typic Ustorthents and similar soils. The remaining 30 percent is components of minor extent.

Flugle soils are on alluvial fans and ridges. These soils are deep, well drained, and moderately permeable. They formed in alluvium. The surface layer is brown sandy loam about 3 inches thick. The subsoil is brown sandy clay loam about 26 inches thick. Below this to a depth of 60 inches or more is light brown sandy loam.

Loarc soils are on alluvial fans, hills, and ridges. These soils are deep, well drained, and moderately permeable. They formed in alluvium that has been modified by wind action. The surface layer is brown sandy loam about 3 inches thick. The upper 16 inches of the subsoil is dark brown sandy clay loam, and the lower 7 inches is brown gravelly sandy loam. The upper 6 inches of the substratum is light brown gravelly sandy loam, and the lower part to a depth of 60 inches or more is pink sandy loam and loamy sand.

Typic Ustorthents are on alluvial fans and hills. These soils are shallow to deep, well drained, and slowly to rapidly permeable. They formed in alluvium. The surface layer is brown fine sandy loam about 2 inches thick. Below this to a depth of 34 inches the soils are light brownish gray and light gray loam or fine sandy loam. Weakly cemented volcanic debris is at a depth of 34 inches.

Of minor extent in this unit are Jacques soils in swales and drainageways and Rock outcrop associated with Typic Ustorthents.

This unit is used for livestock grazing, wildlife habitat, and woodland.

This unit supports a wildlife community that includes elk, deer, brush mouse, Stephen's woodrat, mountain lion, bear, gray fox, bobcat, ringtail, scrub jay, pinyon jay, harlequin quail, brown towhee, Bewick's wren, plain titmouse, red-shafted flicker, chipping sparrow, ash-throated flycatcher, short-horned lizard, collared lizard, red-spotted toad, black-tailed rattlesnake, rock rattlesnake, mountain patch-nosed snake, and Sonoran mountain kingsnake.

Where cliffs and ledges are present, the golden eagle and great horned owl range and nest and the prairie falcon hunts.

5. Motoqua-Datil-Abrazo

Shallow to deep, well drained, sloping to steep soils; on alluvial fans, hills, plains, and ridges

This map unit is in the east-central part of the survey area. This unit is characterized by plains, ridges, hills, and alluvial fans that circle the Plains of San Augustin. Slope is mainly 1 to 50 percent but ranges from 0 to 60 percent. Vegetation on this unit is mainly grass and scattered pinyon and juniper. Elevation is 6,300 to 8,600 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit makes up about 12 percent of the survey area. It is about 30 percent Motoqua and similar soils, 20 percent Datil and similar soils, and 20 percent Abrazo and similar soils. The remaining 30 percent is components of minor extent.

Motoqua soils are on hills. These soils are shallow, well drained, and moderately permeable. They formed in residuum derived dominantly from tuff. The surface layer is brown very gravelly loam about 3 inches thick. The subsoil is dark brown very cobbly clay loam about 7 inches thick. Rhyolitic tuff is at a depth of 10 inches.

Datil soils are on alluvial fans and plains. These soils are deep, well drained, and moderately permeable. They formed in alluvium. The surface layer is brown fine sandy loam about 3 inches thick. The subsoil is brown loam and gravelly clay loam about 19 inches thick. Below this to a depth of 60 inches or more the soils are pinkish gray loam and gravelly sandy clay loam.

Abrazo soils are on hills and ridges. These soils are moderately deep, well drained, and slowly permeable. They formed in residuum and local alluvium derived dominantly from tuff. The surface layer is brown gravelly loam about 9 inches thick. The subsoil is reddish brown and dark reddish brown cobbly clay about 19 inches thick. Below this to a depth of 33 inches the soils are reddish yellow cobbly clay loam. Unweathered tuff is at a depth of 33 inches.

Of minor extent in this unit are Alegros Variant soils on mesas and plateaus and Rock outcrop associated with the Abrazo and Motoqua soils.

This unit is used for livestock grazing and wildlife habitat.

This unit supports a wildlife community that includes mule deer, gray fox, bobcat, porcupine, chipmunk, desert cottontail, pinyon mouse, white-throated woodrat, pinyon jay, scrub jay, ash-throated flycatcher, Cassin's kingbird, eastern fence lizard, short-horned lizard, and black-tailed rattlesnake.

Where this unit includes riparian vegetation such as narrowleaf cottonwood, willow, and baccharis, it supports large and diverse wildlife communities, particularly birds. It provides nesting, roosting, and loafing habitats for many species and migration routes for others.

Where associated with high cliffs and ledges or wooded areas, golden eagle, red-tailed hawk, and prairie falcon hunt over the unit and deer, elk, and mountain lion range into it.

6. Mion-Jacee-Rock outcrop

Shallow and moderately deep, well drained, level to steep soils; on ridges, hills, plains, and alluvial fans

This map unit is in the northeastern corner of the survey area. Slope is 0 to 100 percent. The vegetation on this unit is mainly pinyon, juniper, and open areas of grass. Elevation is 6,000 to 8,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is mainly 115 to 130 days but ranges to 100 days.

This unit makes up about 6 percent of the survey area. It is about 26 percent Mion and similar soils, 23 percent Jacee and similar soils, and 21 percent Rock outcrop. The remaining 30 percent is components of minor extent.

Mion soils are on hills and ridges. These soils are shallow, well drained, and very slowly permeable. They formed in alluvium and residuum derived dominantly from sandstone and shale. The surface layer is brown gravelly clay loam about 2 inches thick. Below this to a depth of 16 inches the soils are light yellowish brown and light brownish gray clay loam and clay. Weathered, soft shale is at a depth of 16 inches.

Jacee soils are on alluvial fans and plains. These soils are moderately deep, well drained, and slowly permeable. They formed in residuum and local alluvium derived dominantly from interbedded sandstone and shale. The surface layer is light yellowish brown loam about 2 inches thick. The subsoil is light yellowish brown and yellowish brown silty clay and clay about 14 inches thick. The substratum is pale yellow silty clay about 8 inches thick. Weathered shale is at a depth of 24 inches.

Rock outcrop consists of areas of exposed sandstone and shale that support little or no vegetation.

Of minor extent in this unit are Catman soils in swales, playas, and drainageways, Royosa soils on hills and ridges, and Badland associated with Rock outcrop.

This unit is used for livestock grazing, wildlife habitat, and woodland.

This unit supports a wildlife community that includes mule deer, gray fox, bobcat, porcupine, cliff chipmunk, white-throated woodrat, pinyon mouse, golden eagle, great horned owl, red-tailed hawk, cliff swallow, bank swallow, white-throated swift, crevice spiny lizard, red-spotted toad, and rock rattlesnake.

7. Penistaja-Veteado

Deep, well drained, sloping soils; on plains and alluvial fans

This map unit is in the north-central part of the survey area. Slope is mainly 1 to 5 percent but ranges to 9 percent. The vegetation on this unit is mainly grass. Elevation is 7,000 to 7,500 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit makes up about 2 percent of the survey area. It is about 40 percent Penistaja and similar soils and 30 percent Veteado and similar soils. The remaining 30 percent is components of minor extent.

Penistaja soils are on plains in areas of old basalt flows. These soils are deep, well drained, and moderately permeable. They formed in alluvium. The surface layer is brown sandy loam about 3 inches thick.

The subsoil is light yellowish brown and brown sandy clay loam about 22 inches thick. Below this to a depth of 60 inches or more is light brown and light yellowish brown sandy loam.

Veteado soils are on alluvial fans and plains. These soils are deep, well drained, and slowly permeable. They formed in fine textured alluvium. The surface layer is brown and pale brown sandy loam about 6 inches thick. The upper 10 inches of the subsoil is brown clay, and the lower 12 inches is light brown sandy clay loam. Below this to a depth of 60 inches or more is light brown sandy clay loam.

Of minor extent in this unit are Viuda soils on plains and Rock outcrop associated with Penistaja soils.

This unit is used for livestock grazing and wildlife habitat.

This unit supports a wildlife community that includes pronghorn antelope, coyote, badger, Gunnison's prairie dog, Botta's pocket gopher, silky pocket mouse, sparrow hawk, horned lark, meadowlark, western spadefoot toad, and prairie rattlesnake.

8. Telescope-Loarc-Augustine

Deep, well drained, level to sloping soils; on alluvial fans and hills

This map unit is on the Plains of San Augustin, in the east-central part of the survey area. Slope is mainly 0 to 10 percent but ranges to 15 percent. The vegetation on this unit is mainly grass. Elevation is 6,500 to 7,600 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit makes up about 10 percent of the survey area. It is about 41 percent Telescope and similar soils, 20 percent Loarc and similar soils, and 15 percent Augustine and similar soils. The remaining 24 percent is components of minor extent.

Telescope soils are on alluvial fans. These soils are deep, well drained, and rapidly permeable. They formed in alluvium and eolian material. The surface layer is brown loamy sand about 3 inches thick. The subsoil is brown sandy loam about 20 inches thick. Below this to a depth of 60 inches or more the soils are brown and light brown loamy sand.

Loarc soils are on alluvial fans and hills. These soils are deep, well drained, and moderately permeable. They formed in alluvium and eolian material. The surface layer is brown sandy loam about 3 inches thick. The upper 16 inches of the subsoil is dark brown sandy clay loam, and the lower 7 inches is brown gravelly sandy loam. The upper 6 inches of the substratum is light brown gravelly sandy loam, and the lower part to a depth of 60 inches or more is pink sandy loam or loamy sand.

Augustine soils are on alluvial fans. These soils are deep, well drained, and moderately slowly permeable. They formed in alluvium. The surface layer is yellowish brown fine sandy loam about 3 inches thick. The subsoil is light brown and brown clay loam about 21 inches thick. Below this to a depth of 60 inches or more the soils are very pale brown loam.

Of minor extent in this unit are Catman soils in swales, playas, and drainageways and Dioxice soils on ridges and alluvial fans.

This unit is used for livestock grazing and wildlife habitat.

This unit supports a wildlife community that includes pronghorn antelope, coyote, badger, black-tailed jackrabbit, thirteen-lined ground squirrel, banner-tailed kangaroo rat, Botta's pocket gopher, silky pocket mouse, meadowlark, horned lark, lark bunting, western spadefoot toad, leopard lizard, and prairie rattlesnake.

Common ravens hunt over this unit, and marsh hawks winter on it. In areas of playas and potholes killdeer nest, mourning dove obtain water, and desert shrimp, annual freshwater clams, and tiger salamander are occasionally present.

9. Tolman-Smilo-Pleioville

Shallow and moderately deep, well drained, level to steep soils; on hills, mountains, alluvial fans, and plains

This map unit is mainly in the southern part of the survey area. Slope is 0 to 60 percent. The vegetation on this unit is grass and trees. Elevation is mainly 7,400 to 10,250 feet but ranges to 6,800 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is mainly 40 to 46 degrees F but ranges to 47 degrees, and the average frost-free period is 80 to 100 days.

This unit makes up about 15 percent of the survey area. It is about 30 percent Tolman and similar soils, 29 percent Smilo and similar soils, and 15 percent Pleioville and similar soils. The remaining 26 percent is components of minor extent.

Tolman soils are on hills and mountains. These soils are shallow, well drained, and moderately permeable. They formed in residuum derived dominantly from tuff. The surface layer is grayish brown extremely cobbly loam about 2 inches thick. The subsoil is brown very cobbly clay loam about 7 inches thick. Unweathered tuff is at a depth of 9 inches.

Smilo soils are on alluvial fans in areas of basalt flows. These soils are moderately deep, well drained, and slowly permeable. They formed in residuum derived dominantly from basalt. The surface layer is dark yellowish brown cobbly sandy loam about 2 inches thick. The upper 6 inches of the subsoil is dark yellowish brown loam, and the lower 17 inches is dark yellowish brown and dark brown cobbly clay and cobbly clay loam. Below this to a depth of 32 inches is dark brown gravelly clay. Unweathered basalt is at a depth of 32 inches.

Pleioville soils are on plains. These soils are moderately deep, well drained, and slowly permeable. They formed in residuum derived dominantly from conglomerate. The surface layer is dark yellowish brown gravelly sandy loam about 2 inches thick. The upper 10 inches of the subsoil is brown and reddish brown gravelly clay and gravelly clay loam, and the lower 12 inches is yellowish red and light reddish brown very gravelly clay and very gravelly clay loam. Conglomerate is at a depth of 24 inches.

Of minor extent in this unit are Valnor soils on mesas and plateaus and Rock outcrop associated with Tolman soils.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The grassland part of this unit supports a wildlife community that includes coyote, badger, Merriam's kangaroo rat, black-tailed jackrabbit, sparrow hawk, horned lark, meadowlark, short-horned lizard, mountain patchnosed snake, and black-tailed rattlesnake.

The woodland areas of this unit support a wildlife community that includes mule deer, white-tailed deer, elk, mountain lion, black bear, bobcat, ringtail, gray-collared chipmunk, Abert's squirrel, white-throated woodrat, pinyon mouse, golden eagle, red-tailed hawk, great horned owl, common raven, scrub jay, pinyon jay, Stellar's jay, red-shafted flicker, short-horned lizard, mountain patchnosed snake, and black-tailed rattlesnake.

Where this unit includes riparian vegetation such as narrowleaf cottonwood, willow, and baccharis, it supports large and diverse wildlife communities, particularly birds. In addition to those noted above, it provides nesting, roosting, and loafing areas for many species and migration routes for others.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar the development of resource plans, but if intensive use of small areas is planned, onsite investigation to precisely define and locate the soils and miscellaneous areas is needed.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying layers, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Catman silty clay, 0 to 2 percent slopes, is one of several phases in the Catman series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or associations.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Albinas-Datil complex, 1 to 5 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Datil-Loarc association, 1 to 15 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Table 2 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Map Unit Descriptions

330 Tejana-Rock outcrop complex, 3 to 15 percent slopes. This map unit is on plains and mesas (fig. 2). Areas are irregular in shape and are 500 to 1,000 acres in size. The present vegetation is grass and scattered juniper trees. Elevation is 6,500 to 7,000 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

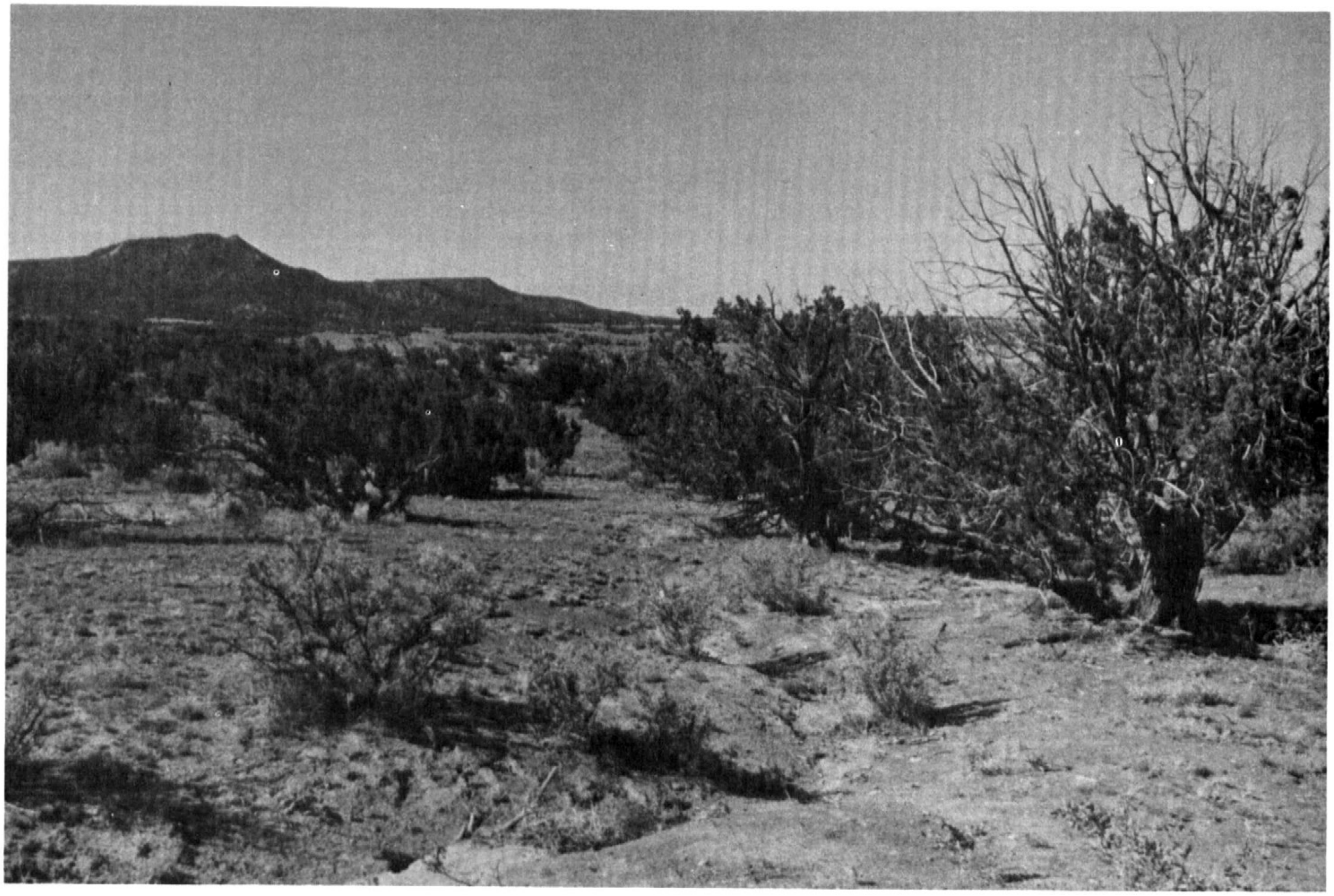

Figure 2. Area of Tejana-Rock outcrop complex, 3 to 15 percent slopes, east of Zuni Salt Lake.

This unit is 60 percent Tejana very gravelly loam and 20 percent Rock outcrop. The Tejana soil is on plains and mesas, and Rock outcrop is on ledges, small escarpments, and side slopes of drainageways.

Included in this unit are small areas of Celacy and Jacee soils on plains and mesas. Included areas make up about 20 percent of the total acreage.

The Tejana soil is deep and well drained. It formed in volcanic ash and cinders underlain by material derived from sandstone. Typically, the surface layer is brown very gravelly loam about 4 inches thick. The upper 20 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light yellowish brown sandy clay loam. The substratum to a depth of 60 inches or more is brownish yellow sandy clay loam.

Permeability of the Tejana soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop is areas of exposed unweathered sandstone. Little if any vegetation is in these areas. Runoff is very rapid.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on the Tejana soil is characterized by blue grama, Indian ricegrass, western wheatgrass, and widely scattered oneseed juniper. Other important plants present in smaller amounts are bottlebrush squirreltail and pine dropseed. The average annual production of air-dry vegetation ranges from 800 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, Indian ricegrass, western wheatgrass, and pine dropseed decrease and there is an increase in plants such as blue grama and oneseed juniper.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Grazing management should be designed to increase the productivity and reproduction of Indian ricegrass and western wheatgrass.

335 Ralphston-Amenson loams, l to 9 percent slopes. This map unit is on hills, ridges, and mesas. Areas are irregular in shape and are l00 to 2,500 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 7,000 to 7,800 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 50 percent Ralphston loam, 1 to 9 percent slopes, and 25 percent Amenson loam, 1 to 4 percent slopes. The Ralphston soil is on side slopes, and the Amenson soil is on ridges and hills.

Included in this unit are areas of Flugle soils on ridges, Albinas soils in swales, and Dioxice soils on side slopes. Included areas make up about 25 percent of the total acreage.

The Ralphston soil is deep and well drained. It formed in material derived dominantly from volcanic ash. Typically, the surface layer is dark brown loam about 2 inches thick. The subsoil is dark brown and brown loam about 11 inches thick. The upper 12 inches of the substratum is pale brown loam and clay loam, and the lower part to a depth of 60 inches or more is white loam.

Permeability of the Ralphston soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Amenson soil is shallow and well drained. It formed in material derived dominantly from volcanic ash. Typically, the surface layer is dark brown loam about 3 inches thick. The subsoil is brown clay loam and very pale brown gravelly loam about 12 inches thick. Indurated caliche is at a depth of 15 inches.

Permeability of the Amenson soil is moderately slow. Available water capacity is very low. Effective rooting depth is 6 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on this unit is characterized by blue grama, western wheatgrass, galleta, prairie junegrass, pinyon, and oneseed juniper. Other important plants present in smaller amounts are Indian ricegrass, bottlebrush squirreltail, and mountainmahogany. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, prairie junegrass, and Indian ricegrass decrease and there is an increase in plants such as blue grama, threeawn, rubber rabbitbrush, oneseed juniper, and pinyon.

This unit is suited for such management practices such as properly locating fences and livestock watering developments, proper grazing use, and planned grazing systems. Rangeland improvement practices such as fencing and pipelines for providing water for livestock are difficult to install on the Amenson soil because of the shallow depth to indurated caliche. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass, prairie junegrass, and Indian ricegrass.

This unit has fair suitability for production of woodland products such as firewood and fenceposts. It currently produces 3 to 6 cords of wood per acre (*5*). Clearcutting is not advisable because of the slow growth and regeneration of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

340 Flugle-Typic Ustorthents association, 2 to 15 percent slopes. This map unit is on hills and alluvial fans. Areas are irregular in shape and are 1,000 to 10,000 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 6,700 to 7,300 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Flugle fine sandy loam, 2 to 15 percent slopes, and 35 percent Typic Ustorthents, 5 to 15 percent slopes. The Flugle soil is on the alluvial fans, and the Typic Ustorthents are on the higher lying side slopes and on hills.

Included in this unit are small areas of Manzano and Jacques soils in swales, Rock outcrop on ridges, and other Flugle soils on the higher lying side slopes. Included areas make up about 25 percent of the total acreage.

The Flugle soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown fine sandy loam about 3 inches thick. The subsoil is brown sandy clay loam about 19 inches thick. The substratum to a depth of 60 inches or more is light brown fine sandy loam.

Permeability of the Flugle soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Typic Ustorthents are shallow to deep and are well drained. They formed in material derived dominantly from sandstone. In an example profile, the surface layer is dark brown sandy loam about 3 inches thick. The underlying material is brown sandy loam about 42 inches thick over sandstone.

Permeability of the Typic Ustorthents is rapid to slow. Available water capacity is low to medium. Effective rooting depth is 10 to 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on this unit is characterized by pinyon, juniper, blue grama, western wheatgrass, galleta, and bottlebrush squirreltail. Other important plants present in smaller amounts are Indian ricegrass, littleseed ricegrass, and prairie junegrass. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, prairie junegrass, and Indian ricegrass decrease and there is an increase in plants such as blue grama, galleta, threeawn, rubber rabbitbrush, oneseed juniper, and pinyon.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding and brush management are suitable practices if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and Indian ricegrass.

This unit is well suited to the production of woodland products such as firewood, fenceposts, Christmas trees, pinyon nuts, and ornamentals. It produces 5 to 7 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

341 Flugle-Jacques association, 1 to 5 percent slopes. This map unit is on alluvial fans and in swales. Areas are irregular or oblong in shape and are 500 to 1,500 acres in size. The present vegetation is mainly pinyon and juniper trees, but grass grows in the swales. Elevation is 7,200 to 7,700 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 45 percent Flugle sandy loam, 3 to 5 percent slopes, and 35 percent Jacques clay loam, 1 to 3 percent slopes. The Flugle soil is on the alluvial fans, and the Jacques soil is in the swales.

Included in this unit are small areas of Loarc soils on toe slopes and Manzano soils in swales. Included areas make up about 20 percent of the total acreage.

The Flugle soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 1 inch thick. The subsoil is brown sandy clay loam about 20 inches thick. The upper 12 inches of the substratum is light brown sandy loam, and the lower part to a depth of 60 inches or more is light brown sandy loam.

Permeability of the Flugle soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Jacques soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown clay loam about 2 inches thick. The subsoil is dark brown clay about 23 inches thick. The substratum to a depth of 60 inches or more is dark brown silty clay.

Permeability of the Jacques soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential understory vegetation on the Flugle soil is characterized by blue grama, western wheatgrass, Indian ricegrass, needleandthread, prairie junegrass, and galleta. The plants that are present in the overstory include pinyon and oneseed juniper. The average annual production of air-dry vegetation ranges from 850 pounds per acre in favorable years to 350 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, Indian ricegrass, and needleandthread decrease and there is an increase in plants such as blue grama, threeawn, pingue, and pinyon.

The potential natural plant community on the Jacques soil is characterized mainly by western wheatgrass, spike muhly, alkali sacaton, blue grama, and fourwing saltbush. This soil is susceptible to invasion by pinyon. The average annual production of air-dry vegetation ranges from 1,350 pounds per acre in favorable years to 600 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and spike muhly decrease and there is an increase in plants such as blue grama, mat muhly, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. Brush management and rangeland seeding are suitable practices if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and Indian ricegrass.

The Flugle soil is well suited to the production of woodland products such as firewood, fenceposts, Christmas trees, pinyon nuts, and ornamentals. It produces 5 to 8 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

347 Datil-Dioxice complex, 1 to 5 percent slopes. This map unit is on alluvial fans and plains. Areas are irregular in shape and are 1,000 to 10,000 acres in size. The present vegetation is grass. Elevation is 7,000 to 7,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit is 50 percent Datil fine sandy loam and 30 percent Dioxice gravelly sandy loam. The Datil soil is on alluvial fans and plains, and the Dioxice soil is on alluvial fans.

Included in this unit are small areas of Guy soils and soils that are similar to this Dioxice soil but are moderately deep and are throughout the unit. Also included are small areas of Manzano soils in swales. Included areas make up about 20 percent of the total acreage.

The Datil soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown fine sandy loam about 4 inches thick. The subsoil is brown clay loam about 16 inches thick. The substratum to a depth of 60 inches or more is very pale brown gravelly sandy loam.

Permeability of the Datil soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Dioxice soil is deep and well drained. It formed in alluvium. Typically, the surface layer is dark brown gravelly sandy loam about 4 inches thick. The upper 10 inches of the subsoil is brown gravelly loam, and the lower 9 inches is pink gravelly sandy loam. The substratum to a depth of 60 inches or more is pinkish white loam.

Permeability of the Dioxice soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, galleta, western wheatgrass, New Mexico feathergrass, and winterfat. Black grama is present in the warmer areas of this unit and on the south-facing side slopes. Other important plants present in smaller amounts are bottlebrush squirreltail and needleandthread. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, New Mexico feathergrass, black grama, and winterfat decrease and there is an increase in plants such as blue grama, broom snakeweed, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and New Mexico feathergrass.

365 Cabezon-Thunderbird-Celsosprings complex, 3 to 25 percent slopes. This map unit is on basalt flows and associated hills, ridges, and mesa tops. Areas are irregular in shape and are 1,000 to 5,000 acres in size. The present vegetation is grass and scattered pinyon and juniper trees. Elevation is 7,000 to 8,000 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit is 45 percent Cabezon cobbly clay loam, 3 to 25 percent slopes; 25 percent Thunderbird loam, 3 to 15 percent slopes; and 15 percent Celsosprings silt loam, 3 to 8 percent slopes. The Cabezon soil is in the steeper areas, and the Thunderbird and Celsosprings soils are on side slopes.

Included in this unit are small areas of Apache soils, soils that are similar to the Cabezon soil but have a high content of rock fragments, and Rock outcrop. These included areas are throughout the unit. Included areas make up about 15 percent of the total acreage.

The Cabezon soil is shallow and well drained. It formed in material derived dominantly from basalt and tuff. Typically, the surface layer is dark brown cobbly clay loam about 4 inches thick. The subsoil is reddish brown clay about 15 inches thick. Basalt is at a depth of 19 inches.

Permeability of the Cabezon soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is moderate.

The Thunderbird soil is moderately deep and well drained. It formed in material derived dominantly from basalt. Typically, the surface layer is brown loam about 5 inches thick. The subsoil is reddish brown clay about 9 inches thick. The substratum is reddish brown clay loam about 9 inches thick. Basalt is at a depth of 23 inches.

Permeability of the Thunderbird soil is very slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Celsosprings soil is deep and well drained. It formed in alluvium derived dominantly from basalt. Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil is reddish brown clay about 28 inches thick. The substratum to a depth of 60 inches or more is reddish brown loam.

Permeability of the Celsosprings soil is slow. Available water capacity is very high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on the Cabezon soil is characterized mainly by western wheatgrass, blue grama, sideoats grama, and prairie junegrass. Mountain muhly, Arizona fescue, and big bluestem are present in the cooler areas of this soil and on north-facing side slopes. Other important plants present in smaller amounts are muttongrass, pine dropseed, and Apacheplume. Oneseed juniper and pinyon are present in scattered stands, but the overall appearance of the potential natural plant community is one of open grassland. The average annual production of air-dry vegetation ranges from 700 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, sideoats grama, Arizona fescue, big bluesten, and muttongrass decrease and there is an increase in plants such as blue grama, galleta, threeawn, and fringed sagewort.

The potential natural plant community on the Celsosprings and Thunderbird soils is characterized mainly by western wheatgrass, spike muhly, blue grama, and sideoats grama. The average annual production of air-dry vegetation ranges from 800 pounds per acre in favorable years to 350 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, spike muhly, and sideoats grama decrease and there is an increase in plants such as blue grama, galleta, ring muhly, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice on the Thunderbird and Celsosprings soils if grazing is deferred. Rangeland improvement practices such as properly locating fences and livestock water pipelines are difficult to install on the Cabezon soil because of the shallow depth to basalt. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass, spike muhly, sideoats grama, and Arizona fescue.

366 Celsosprings stony loam, 1 to 8 percent slopes. This deep, well drained soil is on mesa tops. It formed in alluvium derived dominantly from basalt. Areas are irregular in shape and are 150 to 2,000 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 7,300 to 7,700 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

Typically, the surface layer is dark brown stony loam about 4 inches thick. The subsoil is dark brown cobbly clay about 28 inches thick. The substratum to a depth of 60 inches or more is brown clay loam.

Included in this unit are small areas of Celsosprings loam, Thunderbird soils, and Cabezon soils. Included areas are throughout the unit and make up about 30 percent of the total acreage.

Permeability of this soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on this unit is characterized mainly by western wheatgrass, blue grama, bottlebrush squirreltail, and galleta. Pinyon and juniper are present in scattered stands. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and bottlebrush squirreltail decrease and there is an increase in plants such as blue grama, fringed sagewort, rubber rabbitbrush, pinyon, and juniper.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and bottlebrush squirreltail.

This unit is suited to the production of woodland products such as firewood and fenceposts. The unit produces about 3 cords of wood per acre of trees. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

370 Cabezon-Rock outcrop complex, 3 to 50 percent slopes. This map unit is on ridges associated with basalt flows. Areas are irregular in shape and are l50 to 2,500 acres in size. The present vegetation is grass. Elevation is 6,600 to 7,200 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Cabezon cobbly loam and 40 percent Rock outcrop. The Cabezon soil is in level areas on top of flows, and Rock outcrop is areas of exposed rock on ledges, ridges, and side slopes within the flow.

Included in this unit are small areas of Thunderbird soils and soils that are similar to the Cabezon soil but have a high content of rock fragments. Included areas are throughout the unit and make up about 20 percent of the total acreage.

The Cabezon soil is shallow and well drained. It formed in material derived dominantly from basalt and tuff. Typically, the surface layer is dark brown cobbly loam about 4 inches thick. The subsoil is dark brown cobbly clay loam about 6 inches thick. Basalt is at a depth of 10 inches.

Permeability of the Cabezon soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

Rock outcrop is areas of exposed unweathered basalt. Little if any vegetation is in these areas. Runoff is very rapid.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, sideoats grama, little bluestem, and prairie junegrass. Other important plants present in smaller amounts are wolftail, muttongrass, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 700 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, sideoats grama, little bluestem, and muttongrass decrease and there is an increase in plants such as blue grama, wolftail, broom snakeweed, and fringed sagewort.

This unit is suited to such management practices as proper grazing use and planned grazing systems. Rangeland improvement practices such as properly locating fences and livestock watering developments are difficult to apply because of the shallow depth to basalt. Grazing management should be designed to increase the productivity and reproduction of sideoats grama, little bluestem, and muttongrass.

371 Smilo-Adman complex, 0 to 9 percent slopes. This map unit is on alluvial fans and low ridges in areas of basalt flows. Areas are irregular in shape and are 500 to 3,500 acres in size. The present vegetation is grass. Elevation is 7,400 to 8,400 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 80 to 120 days.

This unit is 40 percent Smilo cobbly sandy loam, 0 to 4 percent slopes, and 30 percent Adman cobbly loam, 2 to 9 percent slopes. The Smilo soil is on the lower lying side slopes, and the Adman soil is on the shorter and steeper side slopes.

Included in this unit are small areas of Rock outcrop, soils that are similar to the Smilo and Adman soils but have a high content of rock fragments and are throughout the unit, and Brycan soils in drainageways. Included areas make up about 30 percent of the total acreage.

The Smilo soil is moderately deep and well drained. It formed in material derived dominantly from basalt. Typically, the surface layer is dark yellowish brown cobbly sandy loam about 2 inches thick. The upper 6 inches of the subsoil is dark yellowish brown loam, and the lower 17 inches is dark brown and dark yellowish brown cobbly clay and cobbly clay loam. The substratum is dark brown gravelly clay about 7 inches thick over basalt.

Permeability of the Smilo soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Adman soil is shallow and well drained. It formed in material derived dominantly from basalt. Typically, the surface layer is dark brown cobbly loam about 2 inches thick. The subsoil is dark yellowish brown and dark brown cobbly clay loam and cobbly clay about 13 inches thick. Basalt is at a depth of 15 inches.

Permeability of the Adman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by mountain muhly, Arizona fescue, muttongrass, and blue grama. Other important plants present in smaller amounts are sideoats grama, big bluestem, and prairie junegrass. The average annual production of air-dry vegetation ranges from 1,200 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, mountain muhly, Arizona fescue, muttongrass, big bluestem, and sideoats grama decrease and there is an increase in plants such as blue grama, wolftail, rubber rabbitbrush, and fringed sagewort.

This unit is suited to such management practices as proper grazing use and planned grazing systems. Rangeland improvement practices such as properly locating fences and pipelines for providing water for livestock are feasible on this unit but are difficult to apply because of rock fragments. Grazing management should be designed to increase the productivity and reproduction of mountain muhly and the cool-season grasses.

373 Gustspring-Guy-Typic Ustorthents complex, 1 to 10 percent slopes. This map unit is on alluvial plains and alluvial fans. Areas are irregular in shape and are 150 to 3,000 acres in size. The present vegetation is grass and scattered pinyon and juniper trees. Elevation is 6,700 to 7,500 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 25 percent Gustspring loamy sand, 1 to 5 percent slopes; 25 percent Guy gravelly sandy loam, 3 to 10 percent slopes; and 20 percent Typic Ustorthents, 1 to 10 percent slopes. The Gustspring soil is on the lower lying side slopes, the Guy soil is in stable areas, and the Typic Ustorthents are in unstable areas.

Included in this unit are small areas of Datil, Dioxice, Flugle, and Lapdun soils in stable areas; Aridic Ustochrepts in the same general positions as the Typic Ustorthents; and Albinas, Hickman, and Manzano soils in swales. Included areas make up about 30 percent of the total acreage.

The Gustspring soil is deep and well drained. It formed in gravelly alluvium. Typically, the surface layer is brown loamy sand about 2 inches thick. The subsoil is dark brown and pale brown gravelly sandy clay loam about 9 inches thick. The upper 11 inches of the substratum is white and pinkish gray gravelly loamy coarse sand, and the lower part to a depth of 60 inches or more is light brown and pinkish gray extremely gravelly loamy coarse sand and very gravelly coarse sand.

Permeability of the Gustspring soil is moderate. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is very high.

The Guy soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown gravelly sandy loam about 2 inches thick. The subsoil is dark brown gravelly sandy loam about 13 inches thick. The substratum to a depth of 60 inches or more is very pale brown gravelly sandy loam.

Permeability of the Guy soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Typic Ustorthents are shallow to deep and are well drained. They formed in alluvium. In an example profile, the surface layer is brown gravelly sandy loam about 5 inches thick. The underlying material is light yellowish brown and brown sandy loam about 37 inches thick. Soft sandstone is at a depth of 42 inches.

Permeability of the Typic Ustorthents is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 10 to 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on the Gustspring soil is characterized mainly by sideoats grama, New Mexico feathergrass, blue grama, black grama, and winterfat. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, New Mexico feathergrass, sideoats grama, black grama, and winterfat decrease and there is an increase in blue grama, wolftail, threeawn, and oneseed juniper.

The potential natural plant community on the Guy soil is characterized mainly by western wheatgrass, blue grama, New Mexico feathergrass, and oneseed juniper. The average annual production of air-dry vegetation ranges from 950 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, New Mexico feathergrass, and winterfat decrease and there is an increase in plants such as blue grama, hairy grama, ring muhly, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass, New Mexico feathergrass, and sideoats grama.

375 Gustspring-Aridic Ustochrepts complex, 5 to 40 percent slopes. This unit is on hills and dissected alluvial fans. Areas are irregular in shape and are 500 to 2,000 acres in size. The present vegetation is grass and scattered pinyon and juniper trees. Elevation is 6,900 to 7,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit is 35 percent Gustspring very gravelly sandy loam, 5 to 15 percent slopes, and 30 percent Aridic Ustochrepts, 5 to 40 percent slopes. The Gustspring soil is in the lower lying areas, and the Aridic Ustochrepts are on hills.

Included in this unit are small areas of Albinas, Hickman, Manzano, and Pietown soils in swales, Guy and Lapdun soils on the lower lying side slopes, and Typic Ustorthents on the edge of drainageways. Included areas make up about 35 percent of the total acreage.

The Gustspring soil is deep and well drained. It formed in gravelly alluvium. Typically, the surface layer is dark grayish brown very gravelly sandy loam about 2 inches thick. The subsoil is very dark grayish brown gravelly sandy clay loam about 7 inches thick. The upper 5 inches of the substratum is brown gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown very gravelly loamy sand.

Permeability of the Gustspring soil is moderate. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Aridic Ustochrepts are moderately deep to deep and are well drained. They formed in alluvium. In an example profile, the surface layer is pale brown gravelly sandy loam about 3 inches thick. The subsoil is brown gravelly fine sandy loam about 7 inches thick. The substratum to a depth of 60 inches or more is pink gravelly loamy sand and light gray gravelly loam.

Permeability of the Aridic Ustochrepts is moderately rapid to rapid. Available water capacity is low to moderate. Effective rooting depth is 20 to 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by sideoats grama, blue grama, New Mexico feathergrass, and little bluestem. Other important plants present in smaller amounts are black grama, which is on south-facing side slopes, and prairie junegrass, which is on north-facing side slopes. Pinyon and oneseed juniper are present in scattered stands. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, sideoats grama, New Mexico feathergrass, and little bluestem decrease and there is an increase in plants such as blue grama, hairy grama, wolftail, threeawn, pinyon, and juniper.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Installation of livestock water pipelines is feasible but is limited by rock fragments. Grazing management should be designed to increase the productivity and reproduction of sideoats grama and New Mexico feathergrass.

382 Datil gravelly fine sandy loam, 1 to 6 percent slopes. This deep, well drained soil is on alluvial fans and plains. It formed in alluvium derived dominantly from volcanic rock. Areas are irregular in shape and are 150 to 2,000 acres in size. The present vegetation is grass and scattered areas of pinyon and juniper trees. Elevation is 7,300 to 7,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is brown gravelly fine sandy loam about 3 inches thick. The subsoil is brown gravelly clay loam about 19 inches thick. The substratum to a depth of 60 inches or more is white gravelly sandy clay loam.

Included in this unit are small areas of Majada and Maia soils on alluvial fans and Manzano soils in swales. Included areas make up about 15 percent of the total acreage.

Permeability of this soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by western wheatgrass, blue grama, bottlebrush squirreltail, and spike muhly. The unit is susceptible to invasion by oneseed juniper. The average annual production of air-dry vegetation ranges from 950 pounds per acre in favorable years to 325 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, bottlebrush squirreltail, and spike muhly decrease and there is an increase in plants such as blue grama, ring muhly, threeawn, and broom snakeweed.

This unit is suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. Grazing management should be designed to increase the productivity and reproduction of western wheatgress and spike muhly.

385 Aridic Argiustolls-Rock outcrop complex, 15 to 45 percent slopes. This map unit is on side slopes of basalt-capped mesas. Areas are long, narrow, and irregular in shape and are 200 to 2,000 acres in size. The vegetation is pinyon and juniper trees. Elevation is 6,500 to 8,200 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 60 percent Aridic Argiustolls and 25 percent Rock outcrop. The Aridic Argiustolls are on side slopes, small hills, and ridges. Rock outcrop is throughout the unit.

Included in this unit are small areas of Majada soils, Guy soils, and Aridic Haplustolls. Included areas are throughout the unit and make up about 15 percent of the total acreage.

The Aridic Argiustolls are shallow to deep and are well drained. They formed in colluvium and local alluvium derived dominantly from volcanic debris. In an example profile, the surface layer is grayish brown stony loam about 3 inches thick. The subsoil is dark brown very cobbly clay loam and very stony clay loam about 25 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown extremely stony loam.

Permeability of the Aridic Argiustolls is very slow to very rapid. Available water capacity is very low to high. Effective rooting depth is 5 to 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight to high.

Rock outcrop is areas of exposed unweathered basalt. Little or no vegetation is in these areas, and surface runoff is very rapid.

This unit is used for livestock grazing, woodland, and wildlife habitat.

The Aridic Argiustolls support a variable potential natural plant community that is characterized by sideoats grama, New Mexico muhly, blue grama, and New Mexico feathergrass. Prairie junegrass, wolftail, oneseed juniper, pinyon, and mountainmahogany are present in smaller amounts.

This unit is suited to such management practices as proper grazing use and planned grazing systems. Because of the steepness of slope and stoniness, livestock trails and fences are needed to help distribute livestock. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

This unit is poorly suited to the production of woodland products such as firewood and fenceposts. It produces 6 cords of wood per acre. Harvesting is not advisable because of the steepness of slope and hazard of water erosion.

387 Rock outcrop-Aridic Ustochrepts complex, 10 to 25 percent slopes. This map unit is on ridges and hills. Areas are irregular in shape and are 150 to 1,000 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass and shrubs. Elevation is 7,200 to 8,700 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 40 to 47 degrees F, and the average frost-free period is 80 to 120 days.

This unit is 40 percent Rock outcrop and 40 percent Aridic Ustochrepts. Rock outcrop is on ledges and escarpments, and Aridic Ustochrepts are in the lower lying areas and in swales.

Included in this unit are small areas of Brycan soils in swales and Smilo and Adman soils adjacent to basalt flows. Included areas make up 20 percent of the total acreage.

Rock outcrop is areas of exposed volcanic tuff. Little if any vegetation is in these areas. Runoff is very rapid.

The Aridic Ustochrepts are shallow to deep and are well drained. They formed in material derived dominantly from volcanic tuff. In an example profile, the surface layer is brown sandy loam about 2 inches thick. The subsoil is brown sandy loam about 23 inches thick. The substratum is brown loamy sand about 11 inches thick over volcanic tuff.

Permeability of the Aridic Ustochrepts is very rapid to slow. Available water capacity is very low to high. Effective rooting depth is 5 to 60 inches or more. Runoff is slow to rapid, and the hazard of water erosion is slight to high. The hazard of soil blowing is moderate to high.

This unit is used for livestock grazing and wildlife habitat.

The Aridic Ustochrepts in this unit support a variable potential natural plant community that is characterized by blue grama, sideoats grama, prairie junegrass, spike muhly, and scattered pinyon and juniper.

This unit is poorly suited to the production of woodland products. Scattered stands of ponderosa pine are in some areas.

390 Rudd-Modyon complex, 3 to 15 percent slopes. This map unit is on basalt flows and mesas. Areas are irregular in shape and are 150 to 15,000 acres in size. The present vegetation is grass (fig. 3) and scattered pinyon and juniper trees. Elevation is 7,200 to 7,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit is 40 percent Rudd gravelly loam and 30 percent Modyon cobbly loam. The Rudd soil is on mesas and in rolling areas on ridges, and the Modyon soil is on side slopes of ridges.

Included in this unit are small areas of Apache and Cabezon soils and Rock outcrop. Included areas are throughout the unit and make up about 30 percent of the total acreage.

The Rudd soil is shallow and well drained. It formed in material derived dominantly from basalt. Typically, the surface layer is dark grayish brown gravelly loam about 2 inches thick. The upper 6 inches of the subsoil is very dark grayish brown cobbly loam, and the lower 7 inches is light brownish gray very cobbly clay loam. The substratum is grayish brown extremely stony loam about 5 inches thick over basalt.

Permeability of the Rudd soil is moderate. Available water capacity is very low. Effective rooting depth is 12 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Modyon soil is moderately deep and well drained. It formed in material derived dominantly from basalt. Typically, the surface layer is dark grayish brown cobbly loam about 3 inches thick. The subsoil is grayish brown very cobbly loam about 13 inches thick. The substratum is grayish brown and white very cobbly loam about 12 inches thick. Basalt is at a depth of 28 inches.

Permeability of the Modyon soil is moderate. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by western wheatgrass, blue grama, New Mexico feathergrass, and bottlebrush squirreltail. Other important plants present in smaller amounts are galleta and black grama, which are on the warmer side slopes. The average annual production of air-dry vegetation ranges from 1,100 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and New Mexico feathergrass decrease and there is an increase in plants such as blue grama, threeawn, and broom snakeweed.

This unit is suited to such management practices as proper grazing use and planned grazing systems. Rangeland improvement practices such as properly locating fences and livestock watering developments are feasible on this unit but are difficult to apply because of rock fragments and the restricted depth to bedrock. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

408 Hubbell loamy sand, 1 to 9 percent slopes. This deep, well drained soil is on alluvial fans of the Zuni

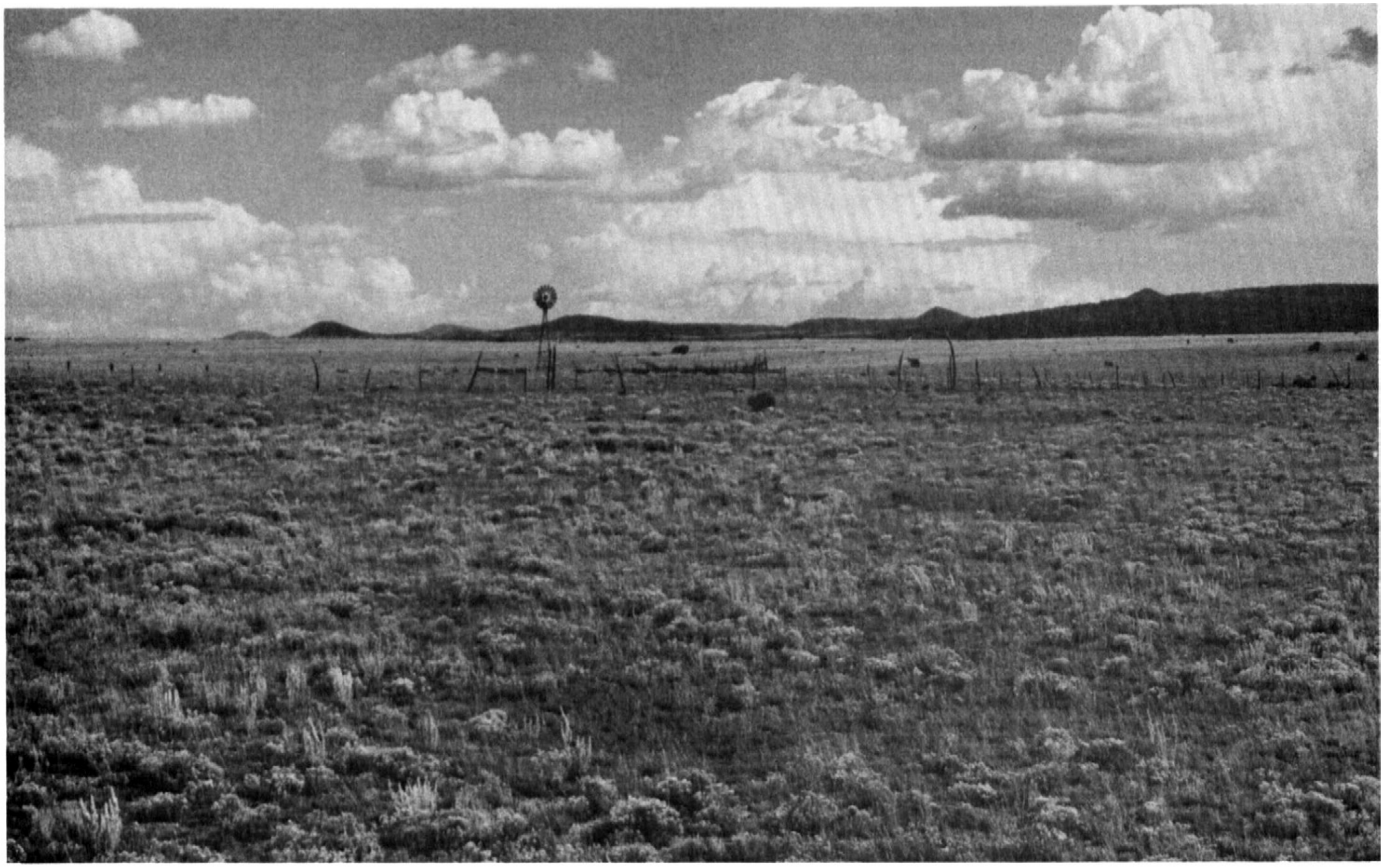

Figure 3. Area of Rudd-Modyon complex, 3 to 15 percent slopes.

Salt Lake Crater Cone. It formed in volcanic ash and cinders. Areas are irregular in shape and are 100 to 2,000 acres in size. The present vegetation is grass and scattered shrubs. Elevation is 6,200 to 6,800 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

Typically, the surface layer is grayish brown loamy sand about 4 inches thick. The underlying material to a depth of 60 inches or more is pale brown, light gray, and grayish brown, stratified loamy sand, sandy loam, and loam.

Included in this unit are small areas of Ceniza soils throughout the unit and sandstone outcroppings on ridges. Included areas make up about 15 percent of the total acreage.

Permeability of this soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is very high. Some small areas may be influenced by toxic salts.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, Indian ricegrass, galleta, western wheatgrass, and fourwing saltbush. Black greasewood and alkali sacaton are present in salt-affected areas. The average annual production of air-dry vegetation ranges from 700 pounds per acre in favorable years to 200 pounds in unfavorable years. As the plant community deteriorates, Indian ricegrass and western wheatgrass decrease and there is an increase in plants such as blue grama, sand dropseed, rubber rabbitbrush, and oneseed juniper.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of Indian ricegrass and western wheatgrass.

409 Ceniza-Gatlin complex, 1 to 15 percent slopes. This map unit is near cinder cones on plains. Areas are irregular in shape and are 100 to 2,000 acres in size. The present vegetation is grass. Elevation is 6,400 to 7,300 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 55 percent Ceniza extremely gravelly loam and 35 percent Gatlin very gravelly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Albinas and Hickman soils in drainageways and areas of sandstone outcroppings near the Zuni Salt Lake. Included areas make up about 10 percent of the total acreage.

The Ceniza soil is deep and excessively drained. It formed in material derived dominantly from volcanic cinders. Typically, the surface layer is grayish brown extremely gravelly loam about 6 inches thick. The upper 24 inches of the underlying material is brown very gravelly loam and extremely gravelly sandy loam, the next 12 inches is very dark gray cinders, and the lower part to a depth of 60 inches or more is yellowish brown sandy clay loam.

Permeability of the Ceniza soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Gatlin soil is deep and well drained. It formed in material derived dominantly from volcanic cinders. Typically, the surface layer is dark brown very gravelly loam about 4 inches thick. The subsoil is brown very gravelly loam about 6 inches thick. The upper 6 inches of the substratum is very pale brown and white extremely gravelly and very gravelly loamy coarse sand, and the lower part to a depth of 60 inches or more is very dark gray extremely gravelly coarse sand.

Permeability of the Gatlin soil is moderate. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, western wheatgrass, bottlebrush squirreltail, and fourwing saltbush. Sideoats grama and New Mexico feathergrass are present in the more cindery areas. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, sideoats grama, and New Mexico feathergrass decrease and there is an increase in plants such as blue grama, threeawn, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and New Mexico feathergrass.

411 Goesling-Celacy complex, 0 to 10 percent slopes. This map unit is on low ridges and mesa tops. Areas are irregular in shape and are 150 to 3,000 acres in size. The present vegetation is grass and scattered juniper trees. Elevation is 6,400 to 6,800 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 50 percent Goesling loamy sand, 0 to 10 percent slopes, and 35 percent Celacy sandy loam, 5 to 10 percent slopes. The Goesling soil is on side slopes, and the Celacy soil is on ridges and side slopes.

Included in this unit are small areas of Rock outcrop in drainageways and on ridges and small areas of Jacee and Mion soils throughout the unit. Included areas make up about 15 percent of the total acreage.

The Goesling soil is deep and well drained. It formed in material derived dominantly from sandstone. Typically, the surface layer is light yellowish brown loamy sand about 4 inches thick. The upper 11 inches of the subsoil is light yellowish brown and brown sandy clay loam, and the lower 15 inches is light yellowish brown clay loam. The upper 12 inches of the substratum is light yellowish brown sandy clay loam, and the lower part to a depth of 64 inches is very pale brown sandy loam.

Permeability of the Goesling soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is very high.

The Celacy soil is moderately deep and well drained. It formed in material derived dominantly from interbedded sandstone and shale. Typically, the surface layer is brown sandy loam about 2 inches thick. The subsoil is brown sandy clay loam about 19 inches thick. The substratum is light yellowish brown sandy clay loam about 10 inches thick. Soft sandstone is at a depth of 31 inches.

Permeability of the Celacy soil is moderate. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on the Goesling soil is characterized mainly by blue grama, needleandthread, galleta, and Indian ricegrass. Other important plants present in smaller amounts are western wheatgrass, bottlebrush squirreltail, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, needleandthread, Indian ricegrass, and western wheatgrass decrease and there is an increase in plants such as blue grama, galleta, threeawn, and rubber rabbitbrush.

The potential natural plant community on the Celacy soil is characterized mainly by blue grama, western wheatgrass, Indian ricegrass, galleta, pinyon, and juniper. The average annual production of air-dry vegetation ranges from 1,000 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and Indian ricegrass decrease and there is an increase in plants such as blue grama, threeawn, rubber rabbitbrush, pinyon, and juniper.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. It is also suited to rangeland seeding if grazing is deferred. Brush management is feasible on the Celacy soil; clearcutting is not advisable, however, and the area treated should be deferred from grazing. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and Indian ricegrass.

This unit is poorly suited to the production of woodland products.

422 Pietown-Hickman complex, 0 to 5 percent slopes. This unit is in swales and drainageways. Areas are long and narrow and are 175 to 3,000 acres. The present vegetation is grass and shrubs. Elevation is 6,000 to 7,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 45 percent Pietown fine sandy loam and 30 percent Hickman very fine sandy loam.

Included in this unit are small areas of sand dunes on north-facing banks and small areas of Catman and saline Catman soils throughout the unit. Included areas make up about 25 percent of the total acreage.

The Pietown soil is deep and well drained. It formed in coarse textured alluvium. Typically, the surface layer is pale brown fine sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is very pale brown, pale brown, and brown, stratified fine sandy loam, silt loam, and loamy fine sand.

Permeability of the Pietown soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to occasional periods of flooding during prolonged high-intensity storms.

The Hickman soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown very fine sandy loam about 1 inch thick. The underlying material to a depth of 60 inches or more is stratified, brown clay loam.

Permeability of the Hickman soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to occasional periods of flooding during prolonged, high-intensity storms.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by western wheatgrass, spike muhly, alkali sacaton, and blue grama. Other important plants present in smaller amounts are vine-mesquite, bottlebrush squirreltail, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 1,300 pounds per acre in favorable years to 600 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and spike muhly decrease and there is an increase in plants such as blue grama, mat muhly, and rubber rabbitbrush.

This unit is suited to such management practices as proper grazing use, planned grazing systems, livestock watering developments, and fencing. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass.

424 Manzano clay loam, 0 to 2 percent slopes. This deep, well drained soil is on flood plains and in swales. It formed in alluvium. Areas are long and narrow and are 100 to 1,000 acres. The present vegetation is grass. Elevation is 6,500 to 7,400 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

Typically, the surface layer is dark brown clay loam about 3 inches thick. The subsoil is dark grayish brown clay loam about 21 inches thick. The substratum to a depth of 60 inches or more is grayish brown clay loam.

Included in this unit are small areas of Albinas, Hickman, and Jacques soils. Included areas are throughout the unit and make up about 15 percent of the total acreage.

Permeability of this soil is moderately slow. Available water capacity is very high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This unit is subject to rare flooding.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on the Manzano soil is characterized mainly by western wheatgrass, alkali sacaton, blue grama, and spike muhly. The average annual production of air-dry vegetation ranges from 3,000 pounds per acre in favorable years to 900 pounds per acre in unfavorable years. As the plant community deteriorates, western wheatgrass, alkali sacaton, and spike muhly decrease and there is an increase in plants such as blue grama, mat muhly, ring muhly, and fringed sagewort.

The Manzano soil is suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. It is also suited to grade stabilization structures in areas that are gullied. Range seeding is a suitable practice if grazing is deferred. Low rainfall, however, limits seeding. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass.

425 Catman-Hickman complex, 1 to 5 percent slopes. This map unit is in swales and broad drainageways. Areas are elongated and are 150 to 8,000 acres in size. The present vegetation is grass and shrubs. Elevation is 6,000 to 7,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 50 percent Catman clay and 25 percent Hickman clay loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of saline Catman soils in areas where water is ponded for brief periods and Pietown soils throughout the unit. Included areas make up about 25 percent of the total acreage.

The Catman soil is deep and well drained. It formed in clayey alluvium. Typically, the surface layer is pale brown clay 3 inches thick. The underlying material to a depth of 60 inches or more is brown and pale brown clay and silty clay loam. The profile is slightly saline.

Permeability of the Catman soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high. This soil is subject to occasional periods of flooding during prolonged, high-intensity storms.

The Hickman soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown clay loam about 4 inches thick. The upper 14 inches of the underlying material is yellowish brown clay loam, the next 18 inches is light yellowish brown loam, and the lower part to a depth of 60 inches or more is light yellowish brown fine sandy loam.

Permeability of the Hickman soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate. This soil is subject to occasional periods of flooding during prolonged, high-intensity storms.

This unit is used for livestock grazing and wildlife habitat.

The soils in this unit support a variable potential natural plant community that is characterized by western wheatgrass, vine-mesquite, alkali sacaton, spike muhly, and blue grama. The average annual production of air-dry vegetation ranges from 1,350 pounds per acre in favorable years to 600 pounds in unfavorable years. When this unit receives additional moisture in the form of runoff from adjacent areas, production is significantly higher. Greasewood and saltgrass are present in the included areas of the saline Catman soils, and production in these areas is extremely low. As the plant community deteriorates, western wheatgrass and spike muhly decrease and there is an increase in plants such as blue grama, ring muhly, mat muhly, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice in the areas of this unit that are not salt-affected and if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass.

459 Telescope loamy fine sand, 3 to 10 percent slopes. This deep, well drained soil is on toe slopes of alluvial fans. It formed in alluvium. Areas are irregular in shape and are 500 to 5,000 acres in size. The present vegetation is scattered pinyon and juniper trees and open areas of grass. Elevation is 6,800 to 7,400 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is brown loamy fine sand about 4 inches thick. The subsoil is dark yellowish brown sandy loam about 13 inches thick. The substratum to a depth of 60 inches or more is brown gravelly fine sandy loam.

Included in this unit are small areas of Augustine and Manzano soils in swales and drainageways. Included areas make up about 15 percent of the total acreage.

Permeability of this soil is rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is none to slight. The hazard of soil blowing is very high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, western wheatgrass, Indian ricegrass, pinyon, and juniper. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and Indian ricegrass decrease and there is an increase in plants such as blue grama, sand dropseed, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, planned grazing systems, and rangeland seeding. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and Indian ricegrass.

463 Datil-Dioxice association, moist, 3 to 15 percent slopes. This map unit is on alluvial fans, hills, and ridges. Areas are irregular in shape and are 400 to 3,000 acres in size. The present vegetation is grass and scattered stands of pinyon and juniper trees. Elevation is 7,000 to 7,500 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

This unit is 35 percent Datil gravelly loam and 35 percent Dioxice gravelly loam. The Datil soil is on hillsides, and the Dioxice soil is on ridgetops.

Included in this unit are small areas of Motoqua and Faraway soils throughout the unit and soils that are similar to the Dioxice soil but are moderately deep and are near ridge crests. Included areas make up about 30 percent of the total acreage.

The Datil soil is deep and well drained. It formed in alluvium. Typically, the surface layer is dark brown gravelly loam about 2 inches thick. The subsoil is dark brown gravelly clay loam about 23 inches thick. The substratum to a depth of 60 inches or more is pinkish gray gravelly loam.

Permeability of the Datil soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Dioxice soil is deep and well drained. It formed in alluvium. Typically, the surface layer is dark brown gravelly loam about 2 inches thick. The upper 5 inches of the subsoil is brown loam, and the lower 18 inches is pinkish gray gravelly loam. The substratum to a depth of 60 inches or more is pinkish white very gravelly sandy loam.

Permeability of the Dioxice soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on this unit is characterized mainly by pinyon, juniper, blue grama, western wheatgrass, and prairie junegrass. Other important plants present in smaller amounts are muttongrass, needleandthread, and galleta. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 375 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, muttongrass, and needleandthread decrease and there is an increase in plants such as blue grama, threeawn, pingue, pinyon, and juniper.

This unit is suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. Brush management and rangeland seeding are suitable practices if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

This unit is well suited to the production of woodland products such as firewood, fenceposts, Christmas trees, pinyon nuts, and ornamentals. It produces 4 to 7 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

471 Faraway-Motoqua-Rock outcrop complex, 8 to 30 percent slopes. This unit is on hills. Areas are irregular in shape and are 100 to 6,000 acres in size. The present vegetation is grass and scattered large stands of pinyon and juniper trees. Elevation is 7,200 to 7,800 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

This unit is 30 percent Faraway very stony loam, 25 percent Motoqua very cobbly loam, and 25 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of soils that are similar to the Faraway and Motoqua soils but are moderately deep and are on the lower lying side slopes or have a low content of rock fragments and are in the more stable areas. Included areas make up about 20 percent of the total acreage.

The Faraway soil is shallow and well drained. It formed in material derived dominantly from volcanic tuff. Typically, the surface layer is brown very stony loam and grayish brown very cobbly loam about 8 inches thick. The underlying material is light yellowish brown very cobbly loam about 4 inches thick. Tuff is at a depth of 12 inches.

Permeability of the Faraway soil is moderate. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is slight.

The Motoqua soil is shallow and well drained. It formed in material derived dominantly from volcanic tuff. Typically, the surface layer is dark grayish brown very cobbly loam about 4 inches thick. The subsoil is dark brown extremely cobbly loam about 8 inches thick. Tuff is at a depth of 12 inches.

Permeability of the Motoqua soil is moderate. Available water capacity is very low. Effective rooting depth is 5 to 20 inches. Runoff is rapid, and the hazard of water erosion is very high. The hazard of soil blowing is moderate.

Rock outcrop is areas of exposed unweathered tuff. Little if any vegetation is in these areas, and surface runoff is very rapid.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on this unit is characterized by prairie junegrass, sideoats grama, pine dropseed, blue grama, pinyon, and juniper. The average annual production of air-dry vegetation ranges from 800 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, the cool-season grasses, sideoats grama, and pine dropseed decrease and there is an increase in plants such as pinyon, oneseed juniper, blue grama, threeawn, and pingue.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Installation of livestock water pipelines is feasible on this unit but is difficult because of the rock fragments, shallow depth to bedrock, and steepness of slope. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

This unit is poorly suited to the production of woodland products. In some areas production of pinyon and juniper ranges from 5 to 6 cords per acre; however, harvesting is not advisable because of the long, steep slopes and the hazard of water erosion.

472 Abrazo-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on hills. Areas are irregular in shape and are 500 to 3,500 acres in size. The present vegetation is grass and scattered pinyon and juniper trees. Elevation is 6,500 to 8,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

This unit is 60 percent Abrazo gravelly loam and 25 percent Rock outcrop. The Abrazo soil is on the tops and sides of hills, and Rock outcrop is areas of exposed rock on ridges, hill crests, and ledges.

Included in this unit are small areas of Apache, Faraway, and Motoqua soils on side slopes throughout the unit and a soil that is similar to the Abrazo soil but has a high content of rock fragments throughout the profile. Included areas make up about 15 percent of the total acreage.

The Abrazo soil is moderately deep and well drained. It formed in material derived dominantly from tuff. Typically, the surface layer is brown gravelly loam about 9 inches thick. The subsoil is dark reddish brown and reddish brown cobbly clay about 19 inches thick. The substratum is reddish yellow cobbly clay loam about 5 inches thick. Tuff is at a depth of 33 inches.

Permeability of the Abrazo soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is moderate.

Rock outcrop is areas of exposed, unweathered tuff. Little or no vegetation is in these areas, and surface runoff is very rapid.

This unit is used mainly for livestock grazing and wildlife habitat. Some areas are used as woodland.

The potential natural plant community on this unit varies, depending on steepness of slope and exposure. The steeper, cooler areas support a plant community consisting of blue grama, mountain muhly, little bluestem, sideoats grama, muttongrass, pinyon, and juniper. The less sloping, warmer areas support a plant community consisting of blue grama, little bluestem, wolftail, New Mexico feathergrass, pinyon, and juniper. Ponderosa pine and oak are present in some areas at the higher elevations and along drainageways. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. If the plant community deteriorates, the cool-season grasses, little bluestem, and sideoats grama decrease and there is an increase in plants such as blue grama, fringed sagewort, broom snakeweed, pinyon, and juniper.

This unit is suited to such management practices as proper grazing use; planned grazing systems, and proper placement of fences, livestock watering developments, and salt. Livestock water pipelines are feasible on this unit but are difficult to install because of the areas of Rock outcrop and steepness of some of the slopes. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

This unit is poorly suited to the production of woodland products.

479 Augustine fine sandy loam, 1 to 6 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium. Areas are irregular in shape and are 200 to 3,500 acres in size. The present vegetation is grass. Elevation is 6,500 to 7,500 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is yellowish brown fine sandy loam about 3 inches thick. The subsoil is brown and light brown clay loam about 21 inches thick. The substratum to a depth of 60 inches or more is very pale brown loam.

Included in this unit are small areas of Gustspring and Datil soils throughout the unit and Manzano soils in swales and drainageways. Included areas make up about 20 percent of the total acreage.

Permeability of the Augustine soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized mainly by blue grama, western wheatgrass, bottlebrush squirreltail, spike muhly, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. If the plant community deteriorates, western wheatgrass, spike muhly, bottlebrush squirreltail, and fourwing saltbush decrease and there is an increase in plants such as blue grama, ring muhly, broom snakeweed, and rubber rabbitbrush.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass.

482 Datil-Guy association, 3 to 15 percent slopes. This map unit is on hills and alluvial fans. Areas are irregular in shape and are 500 to 10,000 acres in size. The present vegetation is pinyon and juniper with open areas of grass. Elevation is 7,200 to 7,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Datril sandy loam, 3 to 10 percent slopes, and 35 percent Guy gravelly sandy loam, 3 to 15 percent slopes. The Datil soil is on side slopes of hills and on alluvial fans, and the Guy soil is on hill crests and side slopes of hills.

Included in this unit are small areas of Gustspring and Loarc soils on alluvial fans, a soil that is similar to the Guy soil but has a high rock fragment content and is on hilltops, and Manzano soils in swales. Included areas make up about 25 percent of the total acreage.

The Datril soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 4 inches thick. The upper 8 inches of the subsoil is brown sandy clay loam, and the lower 10 inches is brown gravelly sandy clay loam. The substratum to a depth of 60 inches or more is pinkish white gravelly loam.

Permeability of the Datil soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Guy soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown gravelly sandy loam about 3 inches thixk. The subsoil is brown gravelly sandy loam about 7 inches thick. The substratum to a depth of 60 inches or more is brown, white, and light gray gravelly loam.

Permeability of the Guy soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for wildlife habitat, livestock grazing, and woodland.

The potential natural plant community on the soils in this unit is characterized mainly by pinyon, juniper, blue grama, western wheatgrass, prairie junegrass, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 1,000 pounds per acre in favorable years to 300 pounds per acre in unfavorable years. As the plant community deteriorates, western wheatgrsss and bottlebrush squirreltail decrease and there is an increase in plants such as blue grama, sand dropseed, threeawns, rubber rabbitbrush, pinyon, and juniper.

This unit is suited to such management practices as livestock watering development, fencing, proper grazing use, and planned grazing systems. Range seeding and brush management are acceptable practices if grazing is deferred. Low rainfall limits range seeding. Grazing management should be designed to increase the productivity and the reproduction of western wheatgrass and bottlebrush squirreltail.

This unit has good potential for production of wood products such as firewood and fence posts. It produces 4 to 7 cords of wood per acre. Clearcutting is not advisable because of the slow growth and regeneration of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

486 Valnor-Midnight association, 1 to 25 percent slopes. This map unit is on plateaus and mesas. Areas are irregular in shape and are 1,000 to 4,000 acres in size. The present vegetation is ponderosa pine, pinyon, and open areas of grass. Elevation is 7,600 to 8,200 feet. The average annual precipitation is about 15 to 18 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 80 to 115 days.

This unit is 45 percent Valnor fine sandy loam, 1 to 7 percent slopes, and 30 percent Midnight very gravelly loam, 3 to 25 percent slopes. The Valnor soil is on side slopes, and the Midnight soil is on side slopes and ridges.

Included in this unit are small areas of Brycan soils in drainageways and swales and sandstone and shale outcroppings on side slopes and ridges. Included areas make up about 25 percent of the total acreage.

The Valnor soil is moderately deep and well drained. It formed in material derived dominantly from interbedded sandstone and shale. Typically, the surface layer is brown fine sandy loam about 6 inches thick. The upper 6 inches of the subsoil is yellowish brown sandy clay loam, and the lower 19 inches is yellowish brown and brown clay and clay loam. The substratum is yellowish brown clay loam about 5 inches thick. Soft carbonaceous shale is at a depth of 36 inches.

Permeability of the Valnor soil is slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Midnight soil is shallow and well drained. It formed in colluvium derived dominantly from sandstone and shale. Typically, the surface layer is brown very gravelly loam about 3 inches thick. The underlying material is pale brown very cobbly clay loam about 4 inches thick. Soft shale is at a depth of 7 inches.

Permeability of the Midnight soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is slight.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on this unit is characterized by pinyon, ponderosa pine, western wheatgrass, pine dropseed, prairie junegrass, blue grama, and scattered oaks. Scattered stands of pinyon and ponderosa pine are also present. The average annual production of air-dry vegetation ranges from 950 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, pine dropseed, and prairie junegrass decrease and there is an increase in plants such as blue grama, rubber rabbitbrush, pingue, pinyon, and Rocky Mountain juniper.

This unit is suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. Installation of livestock water pipelines is feasible on this unit but is difficult because of the steepness of slope in some areas and restricted soil depth. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

This unit is suited to ponderosa pine (*8*). The site index for ponderosa pine ranges from 43 to 60. On the basis of a site index of 50, the potential production per acre of merchantable timber is 3,400 cubic feet or 9,200 board feet (International rule, 1/8 inch kerf) from an even-aged, fully stocked stand of trees 100 years old. At the culmination of the mean annual increment (CMAI), production is 38 cubic feet or 25 board feet per acre (International rule). This unit has few limitations for woodland management.

487 Ustic Torriorthents-Rock outcrop-Badland complex, 20 to 100 percent slopes. This unit is on mesas, in canyons, and on side slopes of intrusive dikes. Areas are irregular in shape and are 100 to 5,000 acres in size. The present vegetation is trees, grass, and shrubs. Elevation is 6,000 to 8,200 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 30 percent Ustic Torriorthents, 30 percent Rock outcrop, and 25 percent Badland. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Hickman, Manzano, and Pietown soils in drainageways and Majada soils on small benches. Included areas make up about 15 percent of the total acreage.

The Ustic Torriorthents are shallow to deep and are well drained. They formed in colluvium and alluvium derived from various kinds of rock. In an example profile, the surface layer is brown fine sandy loam about 4 inches thick. The underlying material to a depth of 12 inches is brown sandy loam. Soft, calcareous sandstone is at a depth of 12 inches.

Permeability of the Ustic Torriorthents is slow to rapid. Available water capacity is very low to high. Effective rooting depth is 4 to 60 inches or more. Runoff is slow to rapid, and the hazard of water erosion is slight to high. The hazard of soil blowing is moderate to high.

Rock outcrop is areas of exposed unweathered basalt, sandstone, and tuff. Little if any vegetation is in these areas. Runoff is very rapid.

Badland consists of side slopes or cone-shaped hills of unconsolidated volcanic sediment of soft shale.

This unit is used for wildlife habitat and livestock grazing.

The Ustic Torriorthents support a variable potential natural plant community that is characterized by diverse herbaceous and woody plants. Blue grama, Indian ricegrass, needlegrasses, muttongrass, mountainmahogany, pinyon, and juniper are in the same areas. As the plant community deteriorates, the cool-season grasses and mountainmahogany decrease and there is an increase in plants such as blue grama, threeawn, pinyon, and juniper.

This unit is poorly suited to the production of woodland products.

492 Jacee-Celacy-Rock outcrop association, 0 to 9 percent slopes. This map unit is on plains. Areas are irregular in shape and are 400 to 10,000 acres in size. The present vegetation is pinyon and juniper trees. Elevation is 6,800 to 7,700 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Jacee loam, 0 to 5 percent slopes; 20 percent Celacy fine sandy loam, 2 to 9 percent slopes; and 20 percent Rock outcrop, 0 to 9 percent slopes. The Jacee soil is in swales, the Celacy soil is on side slopes and ridges, and Rock outcrop is areas of exposed rock on ridges.

Included in this unit are small areas of Catman and Jacques soils in swales, Flugle and Royosa soils in wind-worked areas, and Mion and Travessilla soils in areas adjacent to Rock outcrop. Included areas make up about 20 percent of the total acreage.

The Jacee soil is moderately deep and well drained. It formed in material derived dominantly from interbedded shale and sandstone. Typically, the surface layer is pale brown loam about 7 inches thick. The subsoil is yellowish brown clay loam about 13 inches thick. The substratum is light yellowish brown clay about 9 inches thick. Interbedded sandstone and shale are at a depth of 29 inches.

Permeability of the Jacee soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Celacy soil is moderately deep and well drained. It formed in material derived dominantly from interbedded sandstone and shale. Typically, the surface layer is light yellowish brown fine sandy loam about 3 inches thick. The upper 5 inches of the subsoil is dark yellowish brown fine sandy loam, and the lower 14 inches is yellowish brown sandy clay loam. The substratum is light yellowish brown fine sandy loam about 6 inches thick. Soft bedrock is at a depth of 28 inches.

Permeability of the Celacy soil is moderate. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

Rock outcrop is areas of exposed weathered sandstone. Little if any vegetation is in these areas. Runoff is very rapid.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on the Jacee soil is characterized mainly by blue grama, western wheatgrass, spike muhly, and bottlebrush squirreltail. This soil is susceptible to invasion by pinyon. The average annual production of air-dry vegetation ranges from 1,000 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, bottlebrush squirreltail, and spike muhly decrease and there is an increase in plants such as blue grama, ring muhly, broom snakeweed, and rubber rabbitbrush.

The potential understory vegetation on the Celacy soil is characterized by pinyon, juniper, blue grama, western wheatgrass, prairie junegrass, and galleta. Other important plants present in the understory in smaller amounts include muttongrass and littleseed ricegrass. The plants that are present in the overstory include pinyon and oneseed juniper. As the plant community deteriorates, western wheatgrass, prairie junegrass, muttongrass, and littleseed ricegrass decrease and there is an increase in plants such as blue grama, threeawn, broom snakeweed, pingue, pinyon, and juniper.

The Jacee and Celacy soils are suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. Brush management and rangeland seeding are suitable if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass.

The Celacy soil is well suited to the production of woodland products such as firewood, fenceposts, Christmas trees, pinyon nuts, and ornamentals. The soil produces 5 to 8 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

493 Mion-Travessilla-Rock outcrop complex, 2 to 30 percent slopes. This map unit is on ridges, benches, and side slopes. Areas are irregular in shape and are 100 to 2,500 acres in size. The present vegetation is grass and scattered pinyon and juniper trees. Elevation is 6,500 to 7,800 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 35 percent Mion gravelly clay loam, 25 percent Travessilla very gravelly sandy loam, and 20 percent Rock outcrop. The Mion and Travessilla soils are on side slopes and ridges, and Rock outcrop is on ledges, side slopes, and small escarpments.

Included in this unit are small areas of Badland on the more strongly sloping side slopes; Celacy, Flugle, and Jacee soils on the more gently sloping side slopes; and Catman and Hickman soils in swales. Included areas make up about 20 percent of the total acreage.

The Mion soil is shallow and well drained. It formed in material derived dominantly from interbedded sandstone and shale. Typically, the surface layer is brown gravelly clay loam about 2 inches thick. The underlying material is light yellowish brown and light brownish gray clay loam and clay about 14 inches thick. Soft, weathered shale is at depth of 16 inches.

Permeability of the Mion soil is very slow. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is moderate.

The Travessilla soil is shallow and well drained. It formed in material derived dominantly from sandstone. Typically, the surface layer is light yellowish brown very gravelly sandy loam about 3 inches thick. The underlying material is light olive brown and pale brown cobbly sandy loam about 10 inches thick. Sandstone is at a depth of 13 inches.

Permeability of the Travessilla soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 6 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

Rock outcrop is areas of exposed unweathered sandstone. Little if any vegetation is in these areas. Runoff is very rapid.

This unit is used mainly for livestock grazing and wildlife habitat. Some areas are used as woodland.

The potential natural plant community on this unit is characterized by sideoats grama, needleandthread, western wheatgrass, and blue grama. Other important plants present in smaller amounts are galleta, New Mexico muhly, Indian ricegrass, and scattered pinyon and juniper. The average annual production of air-dry vegetation ranges from 800 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, the cool-season grasses and sideoats grama decrease and there is an increase in plants such as blue grama, galleta, and oneseed juniper.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Livestock water pipelines are difficult to install on the Mion and Travessilla soils because of the shallow depth to sandstone and shale. Grazing management should be designed to increase the productivity and reproduction of needleandthread and sideoats grama.

This unit is poorly suited to the production of woodland products.

494 Catman silty clay, 0 to 2 percent slopes. This deep, well drained soil is in playas. It formed in clayey alluvium. Areas are rounded and irregular in shape and are 1,500 to 40,000 acres in size. The present vegetation is salt tolerant grasses and shrubs. Elevation is 6,700 to 7,000 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is pale brown silty clay about 10 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown silty clay. The profile is moderately saline.

Included in this unit are small areas of Hickman and Manzano soils throughout the unit. Included areas make up about 15 percent of the total acreage.

Permeability of this soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high. This soil is subject to frequent flooding during prolonged, high-intensity storms.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by alkali sacaton and fourwing saltbush. Other important plants present in smaller amounts are vine-mesquite, spike muhly, western wheatgrass, and inland saltgrass. The average annual production of air-dry vegetation ranges from 1,100 pounds per acre in favorable years to 600 pounds in unfavorable years. As the plant community deteriorates, vine-mesquite, spike muhly, western wheatgrass, and alkali sacaton decrease and there is an increase in plants such as mat muhly. In many areas the plant community is almost totally dominated by alkali sacaton.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, planned grazing systems, and rangeland seeding. Low rainfall and moderate salinity limit rangeland seeding. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass, alkali sacaton, and spike muhly.

495 Mion-Catman association, 2 to 17 percent slopes. This map unit is on hills and in swales. Areas are irregular in shape and are 100 to 3,000 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 6,800 to 7,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Mion gravelly clay loam, 5 to 17 percent slopes, and 25 percent Catman clay loam, 2 to 5 percent slopes. The Mion soil is on hills and side slopes, and the Catman soil is in swales and drainageways.

Included in this unit are small areas of sandstone outcroppings and Travessilla soils on hills; Celacy, Flugle, and Jacee soils near the base of hills; and gullied land in swales near arroyos. Included areas make up about 35 percent of the total acreage.

The Mion soil is shallow and well drained. It formed in material derived dominantly from interbedded sandstone and shale. Typically, the surface layer is yellowish brown gravelly clay loam about 3 inches thick. The underlying material is brown clay about 17 inches thick. Soft shale is at a depth of 20 inches.

Permeability of the Mion soil is very slow. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is moderate.

The Catman soil is deep and well drained. It formed in clayey alluvium. Typically, the surface layer is yellowish brown clay loam about 3 inches thick. The underlying material to a depth of 60 inches or more is brown clay.

Permeability of the Catman soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high. This soil is subject to occasional periods of flooding during prolonged, high-intensity storms. It is slightly saline.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on the Mion soil is characterized by scattered pinyon and juniper, galleta, western wheatgrass, blue grama, needleandthread, and winterfat. The average annual production of air-dry vegetation ranges from 800 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, needleandthread, and winterfat decrease and there is an increase in plants such as blue grama, threeawn, and oneseed juniper.

The potential natural plant community on the Catman soil is characterized by western wheatgrass, vine-mesquite, alkali sacaton, spike muhly, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 1,100 pounds per acre in favorable years to 600 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, vine-mesquite, alkali sacaton, and spike muhly decrease and there is an increase in blue grama, ring muhly, mat muhly, and rubber rabbitbrush, which normally occur in small amounts in the potential natural plant community.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice on the Catman soil if grazing is deferred. Deterioration of the vegetation on the Catman soil commonly results in the formation of gullies that drain the areas and reduce production of vegetation. Livestock water pipelines are difficult to install on the Mion soil because of the shallow depth to shale. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

The Mion soil is suited to the production of woodland products such as firewood and fenceposts. It produces 4 to 5 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

497 Royosa fine sand, 3 to 15 percent slopes. This deep, somewhat excessively drained soil is on hills and ridges. It formed in eolian material. Areas are irregular in shape and are l00 to 700 acres in size. The present vegetation is grass and scattered pinyon and juniper trees. Elevation is 7,000 to 7,900 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

Typically, the surface layer is brown fine sand about 4 inches thick. The upper 34 inches of the underlying material is dark yellowish brown loamy sand, and the lower part to a depth of 60 inches or more is yellowish brown sand.

Included in this unit are small areas of Celacy soils on side slopes, sandstone outcroppings on ridges, and Travessilla soils on hilltops. Included areas make up about 20 percent of the total acreage.

Permeability of this soil is very rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is none to slight. The hazard of soil blowing is very high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by Indian ricegrass, needleandthread, western wheatgrass, and blue grama. Other important plants present in smaller amounts are sand dropseed, bottlebrush squirreltail, and scattered pinyon and juniper. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 275 pounds in unfavorable years. As the plant community deteriorates, Indian ricegrass, needleandthread, and western wheatgrass decrease and there is an increase in plants such as blue grama, sand dropseed, spike dropseed, ring muhly, and rubber rabbitbrush.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of Indian ricegrass, needleandthread, and western wheatgrass.

517 Loarc-Telescope loamy sands, 0 to 3 percent slopes. This map unit is on backswamps of the Plains of San Augustin. Areas are irregular in shape and are 500 to 5,000 acres in size. The present vegetation is grass. Elevation is 6,700 to 7,100 feet. The average annual precipitation is about 12 to 15 inches, the average air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

This unit is 60 percent Loarc loamy sand and 25 percent Telescope loamy sand. The Loarc soil is in the lower lying areas, and the Telescope soil is on small hummocks.

Included in this unit are small areas of Augustine and Datil soils on old alluvial fans and a soil that is similar to the Telescope soil but that is loamy sand and sand throughout and is on dunes. Included areas make up about 15 percent of the total acreage.

The Loarc soil is deep and well drained. It formed in wind-worked alluvium. Typically, the surface layer is brown loamy sand about 4 inches thick. The subsoil is dark brown sandy clay loam about 21 inches thick. The substratum to a depth of 60 inches or more is brown sandy loam.

Permeability of the Loarc soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is very high.

The Telescope soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown loamy sand about 2 inches thick. The subsoil is brown sandy loam about 23 inches thick. The substratum to a depth of 60 inches or more is brown sandy loam.

Permeability of the Telescope soil is rapid. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is none to slight. The hazard of soil blowing is very high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, needleandthread, western wheatgrass, bottlebrush squirreltail, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, needleandthread, western wheatgrass, and bottlebrush squirreltail decrease and there is an increase in plants such as blue grama, ring muhly, broom snakeweed, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of needleandthread and western wheatgrass.

525 Telescope loamy sand, 0 to 3 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium. Areas are irregular in shape and are 100 to 2,000 acres in size. The present vegetation is grass. Elevation is 6,800 to 7,100 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is brown loamy sand about 3 inches thick. The subsoil is brown sandy loam about 20 inches thick. The substratum to a depth of 60 inches or more is brown and light brown loamy sand.

Included in this unit are small areas of Loarc soils in level and depressional areas, Manzano soils in swales, salt-affected pan spots in swales and drainageways, and a soil that is similar to the Telescope soil but is loamy sand and sand throughout the profile and is throughout the unit. Included areas make up about 25 percent of the total acreage.

Permeability of this soil is rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is none to slight. The hazard of soil blowing is very high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, needleandthread, western wheatgrass, Indian ricegrass, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, needleandthread, western wheatgrass, and Indian ricegrass decrease and there is an increase in plants such as blue grama, dropseeds, threeawn, and broom snakeweed.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of needleandthread, western wheatgrass, and Indian ricegrass.

540 Goldust gravelly sandy clay loam, 2 to 8 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium. Areas are irregular in shape and are 150 to 2,000 acres in size. The present vegetation is grass. Elevation is 6,300 to 7,400 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

Typically, the surface layer is dark brown gravelly sandy clay loam about 7 inches thick. The upper 14 inches of the subsoil is dark reddish brown gravelly clay loam and reddish brown very gravelly clay loam, and the lower 6 inches is yellowish red very cobbly clay. The substratum to a depth of 60 inches or more is pink very cobbly sandy loam.

Included in this unit are small areas of Abrazo and Datil soils throughout the unit. Included areas make up about 15 percent of the total acreage.

Permeability of this soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by black grama, blue grama, galleta, bottlebrush squirreltail, and soaptree yucca. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, black grama, bottlebrush squirreltail, little bluestem, and sideoats grama decrease and there is an increase in plants such as blue grama, ring muhly, and threeawn.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Grazing management should be designed to increase the productivity and reproduction of black grama.

550 Bario sandy clay loam, 0 to 5 percent slopes. This deep, well drained soil is on upland plains. It formed in material derived dominantly from basalt and conglomerate. Areas are broad and elongated in shape and are 1,000 to 7,000 acres in size. The present vegetation is grass. Elevation is 7,500 to 7,900 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 80 to 120 days.

Typically, the surface layer is brown sandy clay loam about 3 inches thick. The upper 24 inches of the subsoil is reddish brown clay and clay loam, and the lower 21 inches is yellowish red and reddish yellow clay loam and clay. The substratum to a depth of 60 inches or more is light reddish brown clay.

Included in this unit are small areas of Pleioville soils on ridges and side slopes and Brycan soils in drainageways. Included areas make up about 20 percent of the total acreage.

Permeability of this soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is western wheatgrass, spike muhly, prairie junegrass, and blue grama. The average annual production of air-dry vegetation ranges from 1,100 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and spike muhly decrease and there is an increase in blue grama and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and spike muhly.

551 Pleioville gravelly sandy loam, 3 to 15 percent slopes. This moderately deep, well drained soil is on plains. It formed in material derived dominantly from volcanic conglomerate and tuff. Areas are broad and elongated and are 500 to 10,000 acres. The present vegetation is mainly grass, but trees are scattered along the drainageways. Elevation is 7,400 to 8,000 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 80 to 120 days.

Typically, the surface layer is dark yellowish brown gravelly sandy loam about 2 inches thick. The upper 10 inches of the subsoil is reddish brown and brown gravelly clay and gravelly clay loam, and the lower 12 inches is yellowish red and light reddish brown very gravelly clay and very gravelly clay loam. Conglomerate is at a depth of 24 inches.

Included in this unit are small areas of Brycan soils in swales, Bario soils on broad side slopes, and soils that are similar to this Pleioville soil but are deep and are in south-facing areas on ridges. Included areas make up about 20 percent of the total acreage.

Permeability of this soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by mountain muhly, blue grama, western wheatgrass, prairie junegrass, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 1,100 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, mountain muhly, western wheatgrass, and bottlebrush squirreltail decrease and there is an increase in plants such as blue grama, threeawn, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and mountain muhly.

555 Motoqua-Rock outcrop complex, 8 to 30 percent slopes. This map unit is on side slopes. Areas are irregular in shape and are 100 to 10,000 acres in size. The present vegetation is grass. Elevation is 6,800 to 7,500 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

This unit is 60 percent Motoqua very gravelly loam and 20 percent Rock outcrop. The Motoqua soil is in concave areas, and Rock outcrop is on ledges, side slopes, and small escarpments.

Included in this unit are small areas of soils that are similar to the Motoqua soil but are moderately deep and small areas of Faraway and Apache soils. Included areas are throughout the unit. They make up about 20 percent of the total acreage.

The Motoqua soil is shallow and well drained. It formed in material derived dominantly from volcanic tuff. Typically, the surface layer is brown very gravelly loam about 3 inches thick. The subsoil is dark brown very cobbly clay loam about 7 inches thick. Rhyolitic tuff is at a depth of 10 inches.

Permeability of the Motoqua soil is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is moderate.

Rock outcrop is areas of exposed unweathered basalt, rhyolite, and tuff. Little if any vegetation is in these areas. Runoff is very rapid.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit varies depending on the direction of slope. The south-facing side slopes support a plant community consisting of blue grama, black grama, sideoats grama, New Mexico feathergrass, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, black grama, sideoats grama, and New Mexico feathergrass decrease and there is an increase in plants such as blue grama, ring muhly, threeawn, and rubber rabbitbrush.

The north-facing side slopes support a plant community consisting of sideoats grama, blue grama, prairie junegrass, New Mexico feathergrass, and scattered pinyon and juniper. The average annual production of air-dry vegetation ranges from 1,000 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, sideoats grama and New Mexico feathergrass decrease and there is an increase in plants such as blue grama, ring muhly, threeawn, pinyon, and juniper.

Parts of this unit are too steep for use by livestock. Because of the steep, rough terrain, management practices such as properly locating fences, livestock watering developments, livestock trails, and salt and using planned grazing systems are needed to help distribute livestock grazing. Proper grazing use should also be practiced. Installing fences and livestock water pipelines on the Motoqua soil is difficult because of the shallow depth and rough terrain. Grazing management should be designed to increase the productivity and reproduction of black grama, sideoats grama, and New Mexico feathergrass.

560 Mala sandy loam, 1 to 8 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from volcanic sediment. Areas are irregular in shape and are 100 to 3,000 acres in size. The present vegetation is grass. Elevation is 6,900 to 7,300 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is brown sandy loam about 5 inches thick. The upper 5 inches of the subsoil is brown sandy clay loam, and the lower 13 inches is reddish brown and light brown clay loam and gravelly clay loam. The substratum to a depth of 60 inches or more is pink and light brown gravelly loam.

Included in this unit are small areas of Catman and Manzano soils in swales and drainageways. Included areas make up about 20 percent of the total acreage.

Permeability of this soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by western wheatgrass, spike muhly, blue grama, and bottlebrush squirreltail. Arizona fescue and mountain muhly are in some areas at the higher elevations. The average annual production of air-dry vegetation ranges from 1,000 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, spike muhly, and bottlebrush squirreltail decrease and there is an increase in plants such as blue grama, ring muhly, and rubber rabbitbrush.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and spike muhly.

565 Celsosprings loam, 1 to 8 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from basalt and rhyolite. The present vegetation is grass and scattered pinyon trees. Elevation is 6,900 to 7,400 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 160 days.

Typically, the surface layer is brown loam about 3 inches thick. The upper 10 inches of the subsoil is dark brown clay and clay loam, and the lower 13 inches is yellowish red cobbly clay loam. The upper 7 inches of the substratum is brown gravelly clay loam, and the lower part to a depth of 60 inches or more is brown loam.

Included in this unit are small areas of Manzano soils in swales and a soil that is similar to the Celsosprings soil but is moderately deep and is on fans. Included areas make up about 25 percent of the total acreage.

Permeability of this soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on the Celsosprings soil is characterized by western wheatgrass, blue grama, prairie junegrass, and wolftail. Pinyon and oneseed juniper are present in scattered stands. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and prairie junegrass decrease and there is an increase in plants such as blue grama, ring muhly, rubber rabbitbrush, and pinyon.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Rangeland seeding and brush management are suitable practices if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass.

Dense stands of pinyon may become established in some areas of this unit. These areas are well suited to the production of Christmas trees, pinyon nuts, and ornamentals.

575 Joachem-Rock outcrop complex, 3 to 15 percent slopes. This unit is on hills and ridges. Areas are irregular in shape and are 1,000 to 10,000 acres in size. The present vegetation is grass and scattered pinyon and juniper trees. Elevation is 7,100 to 7,500 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

This unit is 50 percent Joachem gravelly sandy loam and 30 percent Rock outcrop. The Joachem soil is in stable areas between areas of Rock outcrop. Rock outcrop consists of areas of exposed rock on ledges and escarpments.

Included in this unit are small areas of a moderately deep soil in swales and Motoqua, Abrazo, and Apache soils throughout the unit. Included areas make up about 20 percent of the total acreage.

The Joachem soil is shallow and well drained. It formed in material derived dominantly from tuff. Typically, the surface layer is grayish brown gravelly sandy loam about 3 inches thick. The subsoil is dark grayish brown cobbly loam about 5 inches thick. The substratum is pale brown very cobbly loam about 3 inches thick. Rhyolitic tuff is at a depth of 11 inches.

Permeability of the Joachem soil is moderate. Available water capacity is very low. Effective rooting depth is 6 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

Rock outcrop is areas of exposed unweathered tuff. Little if any vegetation is in these areas. Runoff is very rapid.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on this unit is characterized by blue grama, prairie junegrass, needleandthread, wolftail, and scattered pinyon and juniper. Black grama is present in the warmer, south-facing areas. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, prairie junegrass and needleandthread decrease and there is an increase in plants such as blue grama, galleta, broom snakeweed, rubber rabbitbrush, pinyon, and juniper.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. This unit is poorly suited to range management practices such as livestock water pipelines because of the shallow depth to bedrock. Grazing management should be designed to increase the productivity and reproduction of needleandthread and prairie junegrass.

This unit is poorly suited to the the production of woodland products.

580 Loarc-Datil complex, moist, 2 to 20 percent slopes. This map unit is on low ridges and hills. Areas are irregular in shape and are 200 to 1,500 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 7,000 to 7,500 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 35 percent Loarc sandy loam, 2 to 8 percent slopes, and 35 percent Datil cobbly loam, 4 to 20 percent slopes. The Datil soil is on ridgetops and side slopes, and the Loarc soil is on side slopes.

Included in this unit are small areas of Diatee and Flugle soils on ridgetops, Manzano soils in swales and drainageways, and Datil soils that have a fine sandy loam surface layer and are on plains. Included areas make up about 30 percent of the total acreage.

The Loarc soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 3 inches thick. The subsoil is dark brown sandy clay loam about 11 inches thick. The substratum to a depth of 60 inches or more is yellowish brown, stratified sandy clay loam and sandy loam.

Permeability of the Loarc soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Datil soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown cobbly loam about 2 inches thick. The subsoil is very dark grayish brown gravelly clay loam about 16 inches thick. The substratum to a depth of 60 inches or more is pinkish gray sandy loam.

Permeability of the Datil soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on the Datil soil is characterized mainly by blue grama, little bluestem, prairie junegrass, and oneseed juniper. Other important plants present in smaller amounts are muttongrass, western wheatgrass, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 800 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, little bluestem, muttongrass, and western wheatgrass decrease and there is an increase in plants such as blue grama, rubber rabbitbrush, pinyon, and juniper.

The potential natural plant community on the Loarc soil is characterized by pinyon, juniper, blue grama, western wheatgrass, Indian ricegrass, and bottlebrush squirreltail. Other important plants present in smaller amounts are galleta, prairie junegrass, littleseed ricegrass, and needleandthread. The average annual production of air-dry vegetation ranges from 875 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, the cool-season grasses decrease and there is an increase in plants such as blue grama, rubber rabbitbrush, pinyon, and juniper.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding and brush management are suitable practices on the Loarc soil if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses and little bluestem.

This unit is suited to the the production of woodland products such as firewood and fenceposts. It produces 4 to 5 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

585 Abrazo-Apache complex, 2 to 15 percent slopes. This map unit is on hills, ridges, and alluvial fans. Areas are irregular in shape and are 100 to 2,000 acres in size. The present vegetation is grass and scattered pinyon and juniper trees. Elevation is 7,000 to 8,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

This unit is 35 percent Abrazo loam, 2 to 10 percent slopes, and 30 percent Apache gravelly sandy loam, 6 to 15 percent slopes. The Abrazo soil is on alluvial fans and ridgetops, and the Apache soil is on hills, ridges, and alluvial fans.

Included in this unit are small areas of Datil soils on alluvial fans and small areas of Motoqua soils and Rock outcrop throughout the unit. Included areas make up about 35 percent of the total acreage.

The Abrazo soil is moderately deep and well drained. It formed in material derived dominantly from tuff. Typically, the surface layer is brown loam about 7 inches thick. The subsoil is brown gravelly clay loam about 22 inches thick. The substratum is brown gravelly clay loam about 7 inches thick. Tuff is at a depth of 36 inches.

Permeability of the Abrazo soil is slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Apache soil is shallow and well drained. It formed in material derived dominantly from volcanic conglomerate. Typically, the surface layer is dark brown gravelly sandy loam about 3 inches thick. The subsoil is dark brown loam about 7 inches thick. The substratum is brown gravelly sandy loam about 4 inches thick. Conglomerate is at a depth of 14 inches.

Permeability of the Apache soil is moderate. Available water capacity is very low. Effective rooting depth is 11 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used mainly for livestock grazing and wildlife habitat. Some areas are used as woodland.

The potential natural plant community on this unit is characterized by blue grama, prairie junegrass, western wheatgrass, bottlebrush squirreltail, pinyon, and juniper. The average annual production of air-dry vegetation ranges from 1,000 pounds per acre in favorable years to 300 pounds in unfavorable years.

If the plant community deteriorates, prairie junegrass, bottlebrush squirreltail, and western wheatgrass decrease and there is an increase in plants such as blue grama, ring muhly, and pinyon.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland improvement practices such as properly locating fences and livestock watering developments are difficult to apply on the Apache soil because of shallow soil depth. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass.

This unit is poorly suited to the the production of woodland products.

590 Penistaja-Viuda-Rock outcrop association, 0 to 9 percent slopes. This map unit is in areas of old basalt flows on plains. Areas are broad and rounded and are 5,000 to 20,000 acres. The present vegetation is grass (fig. 4). Elevation is 7,100 to 7,400 feet. The average annual precipitation is about 9 to 12 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 30 percent Penistaja sandy loam, 1 to 5 percent slopes; 25 percent Viuda gravelly sandy loam, 0 to 3 percent slopes; and 20 percent Rock outcrop, 0 to 9 percent slopes. The Penistaja soil is on ridges and plains, the Viuda soil is in sloping and level areas near basalt flows, and Rock outcrop consists of short, thin lava flows, mounds, and ridges.

Included in this unit are small areas of Catman soils in small playas and a soil that is similar to the Penistaja soil but that is moderately deep and is in areas adjacent to basalt flows. Included areas make up about 25 percent of the total acreage.

The Penistaja soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 3 inches thick. The subsoil is light yellowish brown and brown sandy clay loam about 22 inches thick. The substratum to a depth of 60 inches or more is light brown and light yellowish brown sandy loam.

Permeability of the Penistaja soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Viuda soil is shallow and well drained. It formed in material derived dominantly from basalt. Typically, the surface layer is brown gravelly sandy loam about 2 inches thick. The subsoil is brown gravelly clay about 6 inches thick. The substratum is light yellowish brown gravelly clay loam about 7 inches thick. Basalt is at a depth of 15 inches.

Permeability of the Viuda soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

Rock outcrop is areas of exposed unweathered basalt. Little if any vegetation is in these areas. Runoff is very rapid.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on the Penistaja soil is characterized mainly by blue grama, western wheatgrass, bottlebrush squirreltail, and spike muhly. Other important plants present in smaller amounts are fourwing saltbush and Indian ricegrass. The average annual production of air-dry vegetation ranges from 950 pounds per acre in favorable years to 375 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, spike muhly, and Indian ricegrass decrease and there is an increase in plants such as blue grama, ring muhly, rubber rabbitbrush, and horsebrush.

The potential natural plant community on the Viuda soil is characterized mainly by blue grama, sideoats grama, western wheatgrass, and fourwing saltbush. Other important plants present in smaller amounts are bottlebrush squirreltail, galleta, and wolftail. The average annual production of air-dry vegetation ranges from 1,000 pounds per acre in favorable years to 375 pounds in unfavorable years. As the plant community deteriorates, sideoats grama and western wheatgrass decrease and there is an increase in plants such as blue grama, ring muhly, and broom snakeweed.

This unit is suited to management practices such as properly locating fences and livestock watering developments, proper grazing use, and planned grazing systems. Installation of livestock water pipelines and fences is feasible on the Viuda soil but is difficult because of the shallow depth to basalt. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

592 Celacy-Rock outcrop complex, 2 to 9 percent slopes. This map unit is on upland plains. Areas are irregular in shape and are 250 to 1,000 acres in size. The present vegetation is grass and scattered oneseed juniper. Elevation is 6,300 to 6,900 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 45 percent Celacy loamy sand and 25 percent Rock outcrop. The Celacy soil is on plains, and Rock outcrop is areas of exposed sandstone on ledges, escarpments, and ridges.

Included in this unit are small areas of Jacee, Mion, and Travessilla soils on plains. Included areas make up about 30 percent of the total acreage.

The Celacy soil is moderately deep and well drained. It formed in material derived dominantly from interbedded sandstone and shale. Typically, the surface layer is yellowish brown loamy sand about 5 inches thick. The subsoil is dark yellowish brown sandy clay loam about 11 inches thick. The substratum is dark yellowish brown sandy loam about 6 inches thick. Interbedded shale and sandstone are at a depth of 22 inches.

Permeability of the Celacy soil is moderate. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is very high.

Rock outcrop is areas of exposed unweathered sandstone. Little or no vegetation is in these areas, and surface runoff is very rapid.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, western wheatgrass, galleta, sand dropseed, Indian ricegrass, and scattered

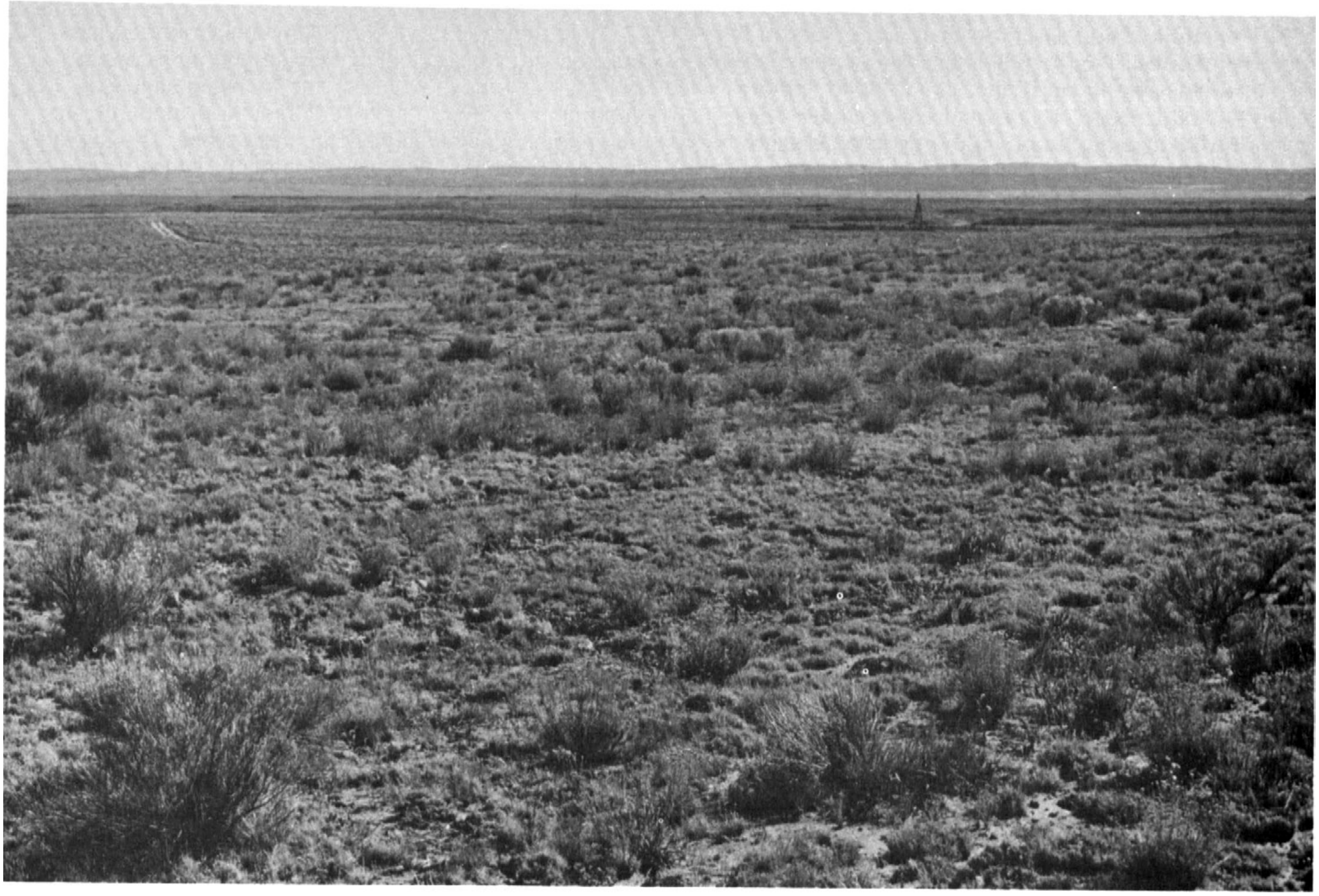

Figure 4. Area of Penistaja-Vluda-Rock outcrop association, 0 to 9 percent slopes.

oneseed juniper. The average annual production of air-dry vegetation ranges from 850 pounds per acre in favorable years to 275 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and Indian ricegrass decrease and there is an increase in plants such as blue grama, galleta, threeawn, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, planned grazing systems, proper grazing use, and rangeland seeding. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and Indian ricegrass.

595 Amenson-Gustspring loams, 2 to 7 percent slopes. This map unit is on mesa tops, alluvial fans, and hills. Areas are irregular in shape and are 100 to 1,400 acres in size. The present vegetation is grass. Elevation is 7,200 to 7,700 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Amenson loam and 35 percent Gustspring loam. The Amenson soil is near the outer edge of mesa tops, and the Gustspring soil is near the center of mapped areas.

Included in this unit are small areas of soils that are similar to the Amenson soil but are moderately deep and soils that are similar to the Gustspring soil but have a high content of rock fragments. Included areas are throughout the unit and make up about 25 percent of the total acreage.

The Amenson soil is shallow and well drained. It formed in material derived dominantly from volcanic ash. Typically, the surface layer is brown loam about 4 inches thick. The subsoil is dark brown gravelly loam about 6 inches thick. The substratum is light brownish gray gravelly loam about 8 inches thick. Indurated caliche is at a depth of 18 inches.

Permeability of the Amenson soil is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Gustspring soil is deep and well drained. It formed in gravelly alluvium. Typically, the surface layer is brown loam 3 inches thick. The subsoil is dark grayish brown gravelly sandy clay loam about 16 inches thick. The upper 12 inches of the substratum is light gray gravelly sandy loam, and the lower part to a depth of 60 inches or more is light gray extremely gravelly loamy coarse sand.

Permeability of the Gustspring soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by New Mexico feathergrass, western wheatgrass, blue grama, bottlebrush squirreltail, and scattered pinyon and juniper trees. Other important plants present in smaller amounts are winterfat, spike muhly, galleta, and sideoats grama. The average annual production of air-dry vegetation ranges from 1,050 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, New Mexico feathergrass, western wheatgrass, and sideoats grama decrease and there is an increase in plants such as blue grama, ring muhly, rubber rabbitbrush, and broom snakeweed.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland improvement practices such as installing livestock water pipelines and fencing are difficult to apply on the Amenson soil because of the shallow depth to indurated caliche. Grazing management should be designed to increase the productivity and reproduction of New Mexico feathergrass, western wheatgrass, and sideoats grama.

606 Tolman-Rock outcrop complex, 25 to 60 percent slopes. This map unit is on ridges and side slopes of canyons. Areas are irregular in shape and are 500 to 3,000 acres in size. The present vegetation is trees and areas of grass. Elevation is 7,600 to 10,250 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 80 to 120 days.

This unit is 45 percent Tolman extremely cobbly loam and 35 percent Rock outcrop. The Tolman soil is in stable areas between areas of Rock outcrop.

Included in this unit are small areas of Coni and Motoqua soils, at the lower elevations and on south-facing side slopes, that have slopes of less than 25 percent. Also included are small areas of Brycan soils in swales and drainageways. Included areas make up about 20 percent of the total acreage.

The Tolman soil is shallow and well drained. It formed in material derived dominantly from tuff. Typically, the surface layer is grayish brown extremely cobbly loam about 2 inches thick. The subsoil is brown very cobbly clay loam and extremely cobbly loam about 7 inches thick. Hard tuff is at a depth of 9 inches.

Permeability of the Tolman soil is moderate. Available water capacity is very low. Effective rooting depth is 7 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is slight.

Rock outcrop is areas of exposed unweathered tuff. Little if any vegetation is in these areas. Runoff is very rapid.

This unit is used for wildlife habitat, livestock grazing, and woodland.

The potential understory vegetation on this unit is characterized by Arizona fescue, prairie junegrass, pine dropseed, and mutton bluegrass. Other important plants present in the understory in smaller amounts include little bluestem and Gambel oak. Where the Tolman soil is on the south-facing side slopes, the potential natural plant community is characterized mainly by blue grama, deergrass, pine dropseed, and little bluestem. As the plant community deteriorates, Arizona fescue, muttongrass, deergrass, and little bluestem decrease and there is an increase in plants such as blue grama, rubber rabbitbrush, and pingue. Pinyon and juniper encroach on the south-facing side slopes (fig. 5).

This unit is suited to such management practices as proper placement of livestock watering developments and salt, proper grazing use, and planned grazing systems. The roughness of the terrain of this unit may lead to overuse of the more accessible areas. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

The areas of the Tolman soil on south-facing side slopes are poorly suited to the production of woodland products. Production of pinyon and juniper ranges from 5 to 9 cords per acre in some areas of the unit; however, harvesting is not advisable because of the steepness of slope and hazard of erosion.

The areas of the Tolman soil on north-facing side slopes are suited to ponderosa pine. The site index for ponderosa pine ranges from 45 to 67. On the basis of a site index of 55, the potential production per acre of merchantable timber is 3,650 cubic feet or 11,900 board feet (International rule, 1/8 inch kerf) from an even-aged,

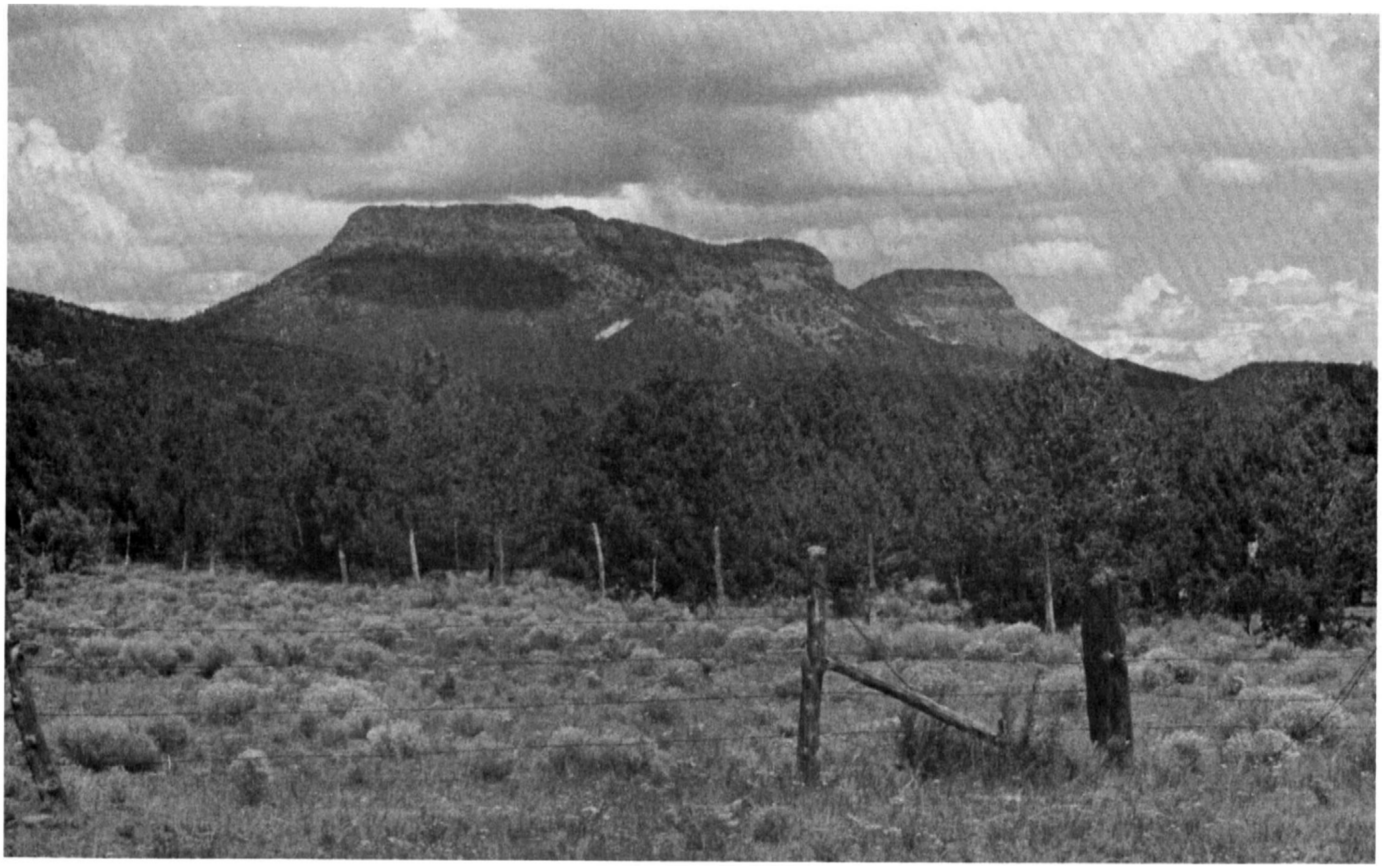

Figure 5. Area of Tolman-Rock outcrop complex, 25 to 60 percent slopes. Pinyon increases rapidly if not controlled.

fully stocked stand of trees 100 years old. At the culmination of the mean annual increment (CMAI), the production is 40 cubic feet or 65 board feet per acre (International rule). This unit has few limitations for woodland management.

612 Typic Argiborolls-Tolman-Motoqua association, 5 to 60 percent slopes. This unit is in mountain canyons. Areas are elongated and are 100 to 1,000 acres. The present vegetation is trees. Elevation is 7,600 to 8,200 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 41 to 46 degrees F, and the average frost-free period is 80 to 115 days.

This unit is 35 percent Typic Argiborolls, 5 to 45 percent slopes; 25 percent Tolman extremely cobbly loam, 25 to 60 percent slopes; and 20 percent Motoqua extremely cobbly loam, 20 to 60 percent slopes. The Typic Argiborolls are on side slopes near canyon bottoms, the Tolman soil is on the higher lying side slopes that face east and north, and the Motoqua soil is on the higher lying side slopes that face south and west.

Included in this unit are small areas of Brycan soils in swales and drainageways, a soil that is similar to the Typic Argiborolls but has a thicker dark-colored surface layer and is near canyon bottoms, and Rock outcrop throughout the unit. Included areas make up about 20 percent of the total acreage.

The Typic Argiborolls are moderately deep and deep and are well drained. They formed in colluvium derived dominantly from volcanic tuff. In an example profile, the surface layer is grayish brown extremely cobbly sandy loam about 3 inches thick. The upper 5 inches of the subsoil is dark grayish brown gravelly loam, and the lower 19 inches is dark brown clay loam and gravelly clay. The substratum is light brown gravelly loam about 9 inches thick. Tuff is at a depth of 36 inches.

Permeability of the Typic Argiborolls is moderately slow to slow. Available water capacity is low to high. Effective rooting depth is 20 to 60 inches or more.

Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Tolman soil is shallow and well drained. It formed in material derived dominantly from tuff. Typically, the surface layer is dark grayish brown extremely cobbly loam about 3 inches thick. The subsoil is dark brown extremely cobbly clay loam about 10 inches thick. Tuff is at a depth of 13 inches.

Permeability of the Tolman soil is moderate. Available water capacity is very low. Effective rooting depth is 7 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is slight.

The Motoqua soil is shallow and well drained. It formed in material derived dominantly from tuff. Typically, the surface layer is dark brown extremely cobbly loam about 2 inches thick. The subsoil is brown very cobbly clay loam about 12 inches thick. Tuff is at a depth of 14 inches.

Permeability of the Motoqua soil is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is slight.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential understory vegetation on the Typic Argiborolls is characterized by western wheatgrass, spike muhly, bottlebrush squirreltail, and blue grama. The average annual production of air-dry vegetation ranges from 2,000 pounds per acre in favorable years to 1,500 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, spike muhly, and bottlebrush squirreltail decrease and there is an increase in plants such as blue grama, mat muhly, and rubber rabbitbrush.

The potential natural plant community on the Motoqua soil is characterized mainly by blue grama, pine dropseed, prairie junegrass, galleta, pinyon, and juniper. Other important plants present in smaller amounts are deergrass and New Mexico feathergrass. As the plant community deteriorates, the cool-season grasses decrease and there is an increase in plants such as blue grama, galleta, broom snakeweed, pinyon, and juniper.

The potential understory vegetation on the Tolman soil is characterized by Arizona fescue, mountain muhly, pine dropseed, and prairie junegrass. Other important plants present in the understory in smaller amounts include blue grama, western wheatgrass, little bluestem, and Gambel oak. Plants that are present in the overstory include ponderosa pine, pinyon, Gambel oak, and alligator juniper.

This unit is suited to such management practices as proper placement of livestock watering developments and salt, planned grazing systems, and proper grazing use. Rangeland improvement practices such as properly locating fences and livestock water pipelines are feasible on parts of this unit but are difficult to apply because of steepness of slope, rock fragments, and the shallow depth of the Tolman and Motoqua soils. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

The Motoqua soil produces 4 to 6 cords of wood per acre. Harvesting is not advisable, however, because of steepness of slope and hazard of water erosion.

The Tolman soil and Typic Argiborolls are well suited to ponderosa pine. The site index for ponderosa pine ranges from 53 to 68. On the basis of a site index of 65, the potential production per acre of merchantable timber is 5,175 cubic feet or 18,300 broad feet (International rule, 1/8 inch kerf) from an even-aged, fully stocked stand of trees 100 years old. At the culmination of the mean annual increment (CMAI), the production is 48 cubic feet or 105 feet per acre (International rule). These soils have few limitations for woodland management.

Tree growth on this unit is slow. Precommercial and commercial thinning should be used to accelerate growth of desirable trees. Gullies limit use of equipment. Minimizing the risk of erosion is essential in harvesting timber. Conventional methods of harvesting timber generally can be used, but their use may be limited when soil is wet. Among the trees that are suited to planting are ponderosa pine and Douglas-fir.

624 Brycan loam, 0 to 3 percent slopes. This deep, well drained soil is on alluvial fans and in swales and broad drainageways. It formed in alluvium. Areas are long and narrow and are 150 to 1,000 acres. The present vegetation is grass. Elevation is 6,800 to 8,000 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 80 to 120 days.

Typically, the surface layer is brown loam about 4 inches thick. The subsoil is brown loam about 30 inches thick. The substratum to a depth of 60 inches or more is brown loam.

Included in this unit are small areas of clayey soils that do not have a dark colored surface layer. Included areas make up about 20 percent of the total acreage.

Permeability of this soil is moderate. Available water capacity is very high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to occasional periods of flooding during prolonged, high-intensity storms.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by western wheatgrass, spike muhly, alkali sacaton, bottlebrush squirreltail, and blue grama. The average annual production of air-dry vegetation ranges from 2,000 pounds per acre in favorable years to 1,500 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, bottlebrush squirreltail, and spike muhly decrease and there is an increase in plants such as blue grama, mat muhly, fringed sagewort, and broom snakeweed.

This unit is suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and bottlebrush squirreltail.

625 Coni-Tolman complex, 10 to 40 percent slopes. This map unit is on ridges. Areas are broad and are 3,000 to 9,000 acres. The present vegetation is grass. Elevation is 7,100 to 9,200 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 80 to 120 days.

This unit is 50 percent Coni very gravelly sandy loam, 10 to 35 percent slopes, and 30 percent Tolman cobbly loam, 10 to 40 percent slopes. The Coni soil is in the lower lying areas, and Tolman soil is in the higher lying areas.

Included in this unit are small areas of Brycan soils in drainageways, Adman and Smilo soils near lava flows, and Rock outcrop on ledges and in the more strongly sloping areas. Included areas make up about 20 percent of the total acreage.

The Coni soil is shallow and well drained. It formed in material derived dominantly from tuff. Typically, the surface layer is dark grayish brown very gravelly sandy loam about 1 inch thick. The subsoil is dark grayish brown gravelly clay loam about 11 inches thick. The substratum is reddish yellow extremely gravelly coarse sand about 3 inches thick. Hard tuff is at a depth of 15 inches.

Permeability of the Coni soil is moderately slow. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Tolman soil is shallow and well drained. It formed in material derived dominantly from basalt. Typically, the surface layer is brown cobbly loam about 4 inches thick. The upper 8 inches of the subsoil is dark brown very cobbly loam, and the lower 6 inches is brown very cobbly clay loam. Basalt is at a depth of 18 inches.

Permeability of the Tolman soil is moderate. Available water capacity is very low. Effective rooting depth is 7 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by mountain muhly, sideoats grama, blue grama, and prairie junegrass. Other important plants present in smaller amounts are muttongrass and Arizona fescue.

The average annual production of air-dry vegetation ranges from 1,000 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, mountain muhly, sideoats grama, Arizona fescue, and muttongrass decrease and there is an increase in plants such as blue grama, wolftail, and fringed sagewort.

This unit is suited to such management practices as proper location of salt, proper grazing use, and planned grazing systems. Installation of livestock water pipelines and fences is feasible on this unit but is difficult because of the steepness of slope and shallow soil depth. Grazing management should be designed to increase the productivity and reproduction of mountain muhly and sideoats grama.

635 Jacee-Mion-Celacy association, 1 to 10 percent slopes. This map unit is on plains, mesa tops, and alluvial fans. Areas are irregular in shape and are 350 to 5,000 acres in size. The present vegetation is mainly grass, but trees are scattered along drainageways. Elevation is 6,300 to 6,700 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 30 percent Jacee loam, 30 percent Mion loam, and 20 percent Celacy loam. The Jacee soil is in the more gently sloping areas, the Mion soil is on ridges and in steeper areas, and the Celacy soil is in the more gently sloping areas.

Included in this unit are small areas of Goesling soils in broad, gently sloping areas and sandstone and shale outcroppings on ridgetops and along drainageways. Included areas make up about 20 percent of the total acreage.

The Jacee soil is moderately deep and well drained. It formed in material derived dominantly from interbedded sandstone and shale. Typically, the surface layer is light yellowish brown loam about 2 inches thick. The subsoil is light yellowish brown and yellowish brown clay and silty clay about 14 inches thick. The substratum is pale yellow silty clay about 8 inches thick. Soft shale is at a depth of 24 inches.

Permeability of the Jacee soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Mion soil is shallow and well drained. It formed in material derived dominantly from interbedded sandstone and shale. Typically, the surface layer is yellowish brown loam about 3 inches thick. The underlying material is light yellowish brown clay loam about 15 inches thick. Soft shale is at a depth of 18 inches.

Permeability of the Mion soil is very slow. Available water capacity is very low. Effective rooting depth is 4 to

20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Celacy soil is moderately deep and well drained. It formed in material derived dominantly from interbedded sandstone and shale. Typically, the surface layer is yellowish brown loam about 3 inches thick. The subsoil is brown clay loam about 9 inches thick. The substratum is light yellowish brown sandy clay loam about 10 inches thick. Interbedded sandstone and shale are at a depth of 22 inches.

Permeability of the Celacy soil is moderate. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, western wheatgrass, galleta, New Mexico feathergrass, needleandthread, and winterfat. Other important plants present in smaller amounts are bottlebrush squirreltail, Indian ricegrass, and fourwing saltbush. Juniper is present in scattered stands. The average annual production of air-dry vegetation ranges from 950 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, New Mexico feathergrass, needleandthread, Indian ricegrass, and winterfat decrease and there is an increase in plants such as blue grama, galleta, rubber rabbitbrush, and broom snakeweed.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Rangeland improvement practices such as properly locating fences and livestock watering developments are difficult to apply on the Jacee and Mion soils because of moderate and shallow depth. Rangeland seeding is a suitable practice on the Jacee and Celacy soils if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass, Indian ricegrass, and New Mexico feathergrass.

645 Albinas-Datil complex, 1 to 5 percent slopes. This map unit is on alluvial fans and in drainageways. Areas are long and narrow to irregular in shape and are 300 to 5,000 acres in size. The present vegetation is grass. Elevation is 7,000 to 7,800 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Albinas sandy loam and 30 percent Datil loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Guy and Dioxice soils on alluvial fans and ridges that have slopes of more than 5 percent and Manzano soils in drainageways. Included areas make up about 30 percent of the total acreage.

The Albinas soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 2 inches thick. The subsoil is brown loam, clay loam, and sandy clay loam about 43 inches thick. The substratum to a depth of 63 inches is brown loam.

Permeability of the Albinas soil is moderate. Available water capacity is very high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare flooding during prolonged high-intensity storms.

The Datil soil is deep and well drained. It formed in alluvium. Typically, the surface layer is dark grayish brown loam about 4 inches thick. The subsoil is brown clay loam about 18 inches thick. The upper 16 inches of the substratum is very pale brown gravelly loam, and the lower part to a depth of 60 inches or more is brown gravelly sandy loam.

Permeability of the Datil soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on the Albinas soil is characterized by western wheatgrass, spike muhly, blue grama, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 1,350 pounds per acre in favorable years to 600 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and spike muhly decrease and there is an increase in plants such as blue grama, ring muhly, and rubber rabbitbrush.

The potential natural plant community on the Datil soil is characterized mainly by blue grama, western wheatgrass, sand dropseed, and bottlebrush squirreltail. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and bottlebrush squirreltail decrease and there is an increase in plants such as blue grama, ring muhly, broom snakeweed, and rubber rabbitbrush.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass.

650 Typic Ustorthents-Hickman-Majada association, 1 to 25 percent slopes. This unit is on hills. Areas are irregular in shape and are 300 to 4,000 acres in size. The present vegetation is grass and scattered stands of trees. Elevation is 6,900 to 7,500 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 30 percent Typic Ustorthents, 3 to 25 percent slopes; 30 percent Hickman loam, 1 to 3 percent slopes; and 15 percent Majada very cobbly sandy loam, 15 to 25 percent slopes. The Typic Ustorthents are throughout the unit, the Hickman soil is in drainageways, and the Majada soil is in the more strongly sloping areas.

Included in this unit are small areas of Manzano and Pietown soils in swales and Rock outcrop on dissected side slopes and in drainageways. Included areas make up about 25 percent of the total acreage.

The Typic Ustorthents are shallow to deep and are well drained. They formed in material derived dominantly from volcanic debris. In an example profile, the surface layer is brown fine sandy loam about 2 inches thick. The upper 6 inches of the underlying material is light brownish gray loam, and the lower part to a depth of 34 inches is light gray loam and fine sandy loam. Weakly cemented volcanic debris is at a depth of 34 inches.

Permeability of the Typic Ustorthents is slow to rapid. Available water capacity is very low to moderate. Effective rooting depth is 4 to 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is high.

The Hickman soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown loam about 3 inches thick. The upper 29 inches of the underlying material is brown, stratified loam, sandy clay loam, and clay loam, and the lower part to a depth of 60 inches or more is pale brown sandy loam.

Permeability of the Hickman soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to occasional periods of flooding during prolonged, high-intensity storms.

The Majada soil is deep and well drained. It formed in alluvium derived dominantly from basalt. Typically, the surface layer is grayish brown very cobbly sandy loam about 3 inches thick. The subsoil is brown very cobbly sandy clay loam about 14 inches thick. The substratum to a depth of 60 inches or more is light gray extremely stony loam.

Permeability of the Majada soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used mainly for livestock grazing and wildlife habitat. Some areas are used as woodland.

The potential natural plant community on the Typic Ustorthents and the Majada soil is characterized by black grama, sideoats grama, galleta, blue grama, and fourwing saltbush. Other important plants present in smaller amounts are wolftail, western wheatgrass, muttongrass, little bluestem, and mountainmahogany. The average annual production of air-dry vegetation ranges from 1,200 pounds per acre in favorable years to 500 pounds in unfavorable years. As the plant community deteriorates, the cool-season grasses, black grama, sideoats grama, and mountainmahogany decrease and there is an increase in plants such as blue grama, galleta, threeawn, rubber rabbitbrush, and broom snakeweed.

The potential natural plant community on the Hickman soil is characterized by western wheatgrass, spike muhly, alkali sacaton, and blue grama. Other important plants present in smaller amounts are vine-mesquite, bottlebrush squirreltail, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 1,300 pounds per acre in favorable years to 600 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and spike muhly decrease and there is an increase in plants such as blue grama, mat muhly, and rubber rabbitbrush.

This unit is suited to such management practices as proper grazing use, fencing, planned grazing systems, proper location of salt and livestock watering developments, and establishment of livestock trails. Installation of fences and livestock water pipelines is feasible but is difficult because of the steepness of slope. Rangeland seeding is a suitable practice on the Hickman soil if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses, sideoats grama, black grama, and mountainmahogany.

This unit is poorly suited to the production of woodland products.

655 Majada-Lapdun very cobbly loams, 1 to 8 percent slopes. This map unit is on mesas, plains, and alluvial fans. Areas are oblong to irregular in shape and are 600 to 3,000 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 7,300 to 7,700 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 45 percent Majada very cobbly loam and 35 percent Lapdun very cobbly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Amenson and Gustspring soils throughout the unit. Included areas make up about 20 percent of the total acreage.

The Majada soil is deep and well drained. It formed in alluvium derived dominantly from basalt. Typically, the surface layer is brown very cobbly loam about 3 inches thick. The subsoil is brown and dark brown very cobbly loam and very cobbly clay loam about 18 inches thick. The substratum to a depth of 60 inches or more is white very cobbly loam.

Permeability of the Majada soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Lapdun soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown very cobbly loam about 2 inches thick. The subsoil is grayish brown and dark grayish brown very cobbly loam about 12 inches thick. The upper 22 inches of the substratum is light gray very cobbly loam, and the lower part to a depth of 60 inches or more is pink very cobbly loamy sand.

Permeability of the Lapdun soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on this unit is characterized by oneseed juniper, pinyon, blue grama, western wheatgrass, bottlebrush squirreltail, and winterfat. The average annual production of air-dry vegetation ranges from 875 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and bottlebrush squirreltail decrease and there is an increase in plants such as blue grama, threeawn, rubber rabbitbrush, pinyon, and juniper.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Rangeland seeding and brush management are suitable practices if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass, bottlebrush squirreltail, and winterfat.

This unit is well suited to the production of woodland products such as firewood, fenceposts, Christmas trees, pinyon nuts, and ornamentals. It produces 5 to 9 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

660 Datil-Loarc association, 1 to 15 percent slopes. This map unit is on plains. Areas are irregular in shape and are 500 to 4,000 acres in size. The present vegetation is grass. Elevation is 6,300 to 7,500 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Datil sandy loam, 1 to 15 percent slopes, and 40 percent Loarc sandy loam, 1 to 8 percent slopes. The Datil soil is in the higher lying areas of the unit, and the Loarc soil is in the lower lying areas.

Included in this unit are small areas of Manzano soils in swales and Guy soils in the more strongly sloping areas. Included areas make up about 20 percent of the total acreage.

The Datil soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 2 inches thick. The subsoil is pale brown sandy clay loam about 21 inches thick. The substratum to a depth of 60 inches or more is white loam.

Permeability of the Datil soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Loarc soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 3 inches thick. The upper 16 inches of the subsoil is dark brown sandy clay loam, and the lower 7 inches is brown gravelly sandy loam. The upper 6 inches of the substratum is light brown gravelly sandy loam, and the lower part to a depth of 60 inches or more is pink sandy loam and loamy sand.

Permeability of the Loarc soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by western wheatgrass, blue grama, spike muhly, bottlebrush squirreltail, and winterfat. The average annual production of air-dry vegetation ranges from 950 pounds per acre in favorable years to 375 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, spike muhly, bottlebrush squirreltail, and winterfat decrease and there is an increase in plants such as blue grama, ring muhly, threeawn, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and spike muhly.

665 Veteado-Penistaja sandy loams, 1 to 5 percent slopes. This map unit is on plains and alluvial fans. Areas are broad and irregular in shape and are 2,000 to 20,000 acres in size. The present vegetation is grass. Elevation is 7,000 to 7,500 feet. The average annual precipitation is about 9 to 12 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 45 percent Veteado sandy loam, 1 to 4 percent slopes, and 40 percent Penistaja sandy loam, 1 to 5 percent slopes. The Veteado soil is on alluvial fans, and the Penistaja soil is on ridges and plains.

Included in this unit are small areas of Catman and saline Catman soils in swales and small playas and a soil that is similar to the Veteado soil but has a darker colored surface layer and is on alluvial fans. Included areas make up about 15 percent of the total acreage.

The Veteado soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown and pale brown sandy loam about 6 inches thick. The upper 10 inches of the subsoil is brown clay, and the lower 12 inches is light brown sandy clay loam. The substratum to a depth of 60 inches or more is light brown sandy clay loam.

Permeability of the Veteado soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Penistaja soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is brown sandy clay loam about 15 inches thick. The substratum to a depth of 60 inches or more is brown sandy loam.

Permeability of the Penistaja soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, western wheatgrass, bottlebrush squirreltail, and spike muhly. Other important plants present in smaller amounts are galleta, needleandthread, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 950 pounds per acre in favorable years to 375 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, bottlebrush squirreltail, spike muhly, and needleandthread decrease and there is an increase in plants such as blue grama, ring muhly, and rubber rabbitbrush.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Rangeland seeding is a suitable practice if grazing is deferred; however, low precipitation limits seeding. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and needleandthread.

670 Diatee-Flugle association, 1 to 9 percent slopes. This map unit is on dissected alluvial fans and alluvial terraces. Areas are irregular in shape and are 400 to 4,000 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 7,500 to 8,000 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Diatee gravelly sandy loam, 1 to 5 percent slopes, and 35 percent Flugle loam, 3 to 9 percent slopes. The Diatee soil is on the tops of alluvial fans, and the Flugle soil is on side slopes.

Included in this unit are small areas of Loarc soils on toe slopes of alluvial fans, Manzano soils in swales, and Gustspring soils on alluvial fans. Included areas make up about 25 percent of the total acreage.

The Diatee soil is deep and well drained. It formed in gravelly alluvium derived dominantly from volcanic sediment. Typically, the surface layer is brown gravelly sandy loam about 2 inches thick. The upper 12 inches of the subsoil is brown and dark brown gravelly sandy clay loam, and the lower 4 inches is brown very gravelly sandy clay loam. The substratum to a depth of 60 inches or more is light brown and pink very gravelly coarse sand.

Permeability of the Diatee soil is moderate. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Flugle soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown loam about 4 inches thick. The subsoil is brown sandy clay loam about 21 inches thick. The substratum to a depth of 60 inches or more is light brown sandy loam.

Permeability of the Flugle soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on the Diatee soil is characterized by pinyon, juniper, blue grama, bottlebrush squirreltail, and western wheatgrass. Other important plants are pine dropseed and galleta. The average annual production of air-dry vegetation ranges from 750 pounds per acre in favorable years to 250 pounds in unfavorable years. As the plant community deteriorates, bottlebrush squirreltail, western wheatgrass, prairie junegrass, and pine dropseed decrease and there is an increase in plants such as pinyon, oneseed juniper, and blue grama.

The potential natural plant community on the Flugle soil is characterized by blue grama, needleandthread, western wheatgrass, Indian ricegrass, pinyon, and juniper. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, needleandthread, western wheatgrass, and Indian ricegrass decrease and there is an increase in plants such as blue grama, pinyon, juniper, pingue, and rubber rabbitbrush.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Brush management and rangeland seeding are suitable practices if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

This unit is well suited to the production of woodland products such as firewood and fenceposts. It produces 5 to 7 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

671 Smilo-Adman complex, moist, 3 to 15 percent slopes. This map unit is on basalt hills. Areas are irregular in shape and are 100 to 3,000 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 7,400 to 8,400 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 80 to 120 days.

This unit is 55 percent Smilo stony loam and 25 percent Adman stony loam. The components of this unit are so intricately intermingled that it was not practical to separate them at the scale used.

Included in this unit are small areas of Coni soils throughout the unit and a deep clayey soil in the more gently sloping areas. Included areas make up about 20 percent of the total acreage.

The Smilo soil is moderately deep and well drained. It formed in material derived dominantly from basalt. Typically, the surface layer is dark grayish brown stony loam about 5 inches thick. The subsoil is very dark grayish brown cobbly clay about 20 inches thick. The substratum is white gravelly clay loam about 5 inches thick. Basalt is at a depth of 30 inches.

Permeability of the Smilo soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Adman soil is shallow and well drained. It formed in material derived dominantly from basalt. Typically, the surface layer is dark grayish brown stony loam about 3 inches thick. The subsoil is dark grayish brown cobbly clay about 16 inches thick. Basalt is at a depth of l9 inches.

Permeability of the Adman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential understory vegetation on this unit is characterized by pine dropseed, Arizona fescue, muttongrass, mountain muhly, and sideoats grama. The plants that are present in the overstory include pinyon, alligator juniper, oaks, and scattered ponderosa pine. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, the cool-season grasses, mountain muhly, and sideoats grama decrease and there is an increase in plants such as blue grama, threeawn, fringed sagewort, pinyon, and juniper.

This unit is suited to such management practices as livestock watering developments, fencing, proper grazing use, and planned grazing systems. Rangeland improvement practices such as properly locating fences and livestock water pipelines are difficult to install on the Adman soil because of shallow depth. Grazing management should be designed to increase the productivity and reproduction of Arizona fescue and mountain muhly.

This unit is well suited to the production of woodland products such as firewood, fenceposts, Christmas trees, pinyon nuts, and ornamentals. It can produce 6 to 9 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

675 Loarc-Flugle-Manzano association, 1 to 9 percent slopes. This map unit is on alluvial fans. Areas are irregular in shape and are 2,000 to 15,000 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 7,200 to 7,600 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 40 percent Loarc sandy loam, 2 to 6 percent slopes; 30 percent Flugle sandy loam, 2 to 9 percent slopes; and 20 percent Manzano loam, 1 to 2 percent slopes. The Loarc soil is on the lower lying side slopes, the Flugle soil is on the higher lying side slopes, and the Manzano soil is in swales.

Included in this unit are small areas of Ralphston soils on the lower lying side slopes. Included areas make up about 10 percent of the total acreage.

The Loarc soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 2 inches thick. The subsoil is dark brown sandy clay loam about 21 inches thick. The substratum to a depth of 60 inches or more is light brownish gray sandy loam.

Permeability of the Loarc soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Flugle soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown sandy loam about 3 inches thick. The subsoil is brown sandy clay loam about 26 inches thick. The substratum to a depth of 60 inches or more is light brown sandy loam.

Permeability of the Flugle soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Manzano soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown loam about 2 inches thick. The upper 20 inches of the subsoil is dark brown clay loam and brown loam, and the lower 13 inches is brown loam. The substratum to a depth of 60 inches or more is pale brown loam.

Permeability of the Manzano soil is moderately slow. Available water capacity is very high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on the Loarc and Flugle soils is characterized by pinyon, juniper, blue grama, needleandthread, western wheatgrass, and galleta. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 400 pounds in unfavorable years. As the plant community deteriorates, needleandthread and western wheatgrass decrease and there is an increase in plants such as blue grama, pinyon, juniper, pingue, and rubber rabbitbrush.

The potential natural plant community on the Manzano soil is characterized by western wheatgrass, spike muhly, bottlebrush squirreltail, and blue grama. The average annual production of air-dry vegetation ranges from 1,350 pounds per acre in favorable years to 600 pounds in unfavorable years. If the plant community deteriorates, western wheatgrass and spike muhly decrease and there is an increase in plants such as blue grama, ring muhly, mat muhly, and rubber rabbitbrush.

This unit is suited to such management practices as fencing, livestock watering developments, proper grazing use, and planned grazing systems. Brush management and rangeland seeding are suitable practices on the Flugle and Loarc soils if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

This unit is suited to the production of woodland products such as firewood and fenceposts. It produces 4 to 5 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

680 Jacques clay loam, 1 to 5 percent slopes. This deep, well drained soil is in swales and drainageways. It formed in clayey alluvium. Areas are long and narrow and are 100 to 500 acres. The present vegetation is grass. Elevation is 7,100 to 7,500 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

Typically, the surface layer is dark brown clay loam about 5 inches thick. The subsoil is dark brown clay and silty clay loam about 21 inches thick. The upper 26 inches of the substratum is dark brown clay, and the lower part to a depth of 60 inches or more is light brown sandy clay loam.

Included in this unit are small areas of Catman and Manzano soils. Included areas are throughout the unit and make up about 20 percent of the total acreage.

Permeability of this soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate. This soil is subject to occasional periods of flooding during prolonged, high-intensity storms.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized mainly by western wheatgrass, spike muhly, alkali sacaton, bottlebrush squirreltail, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 1,350 pounds per acre in favorable years to 600 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, spike muhly, and alkali sacaton decrease and there is an increase in plants such as blue grama, mat muhly, and rubber rabbitbrush.

This unit is suited to such management practices as livestock watering developments, fencing, and proper grazing use. It is also suited to grade stabilization structures in gullied areas. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass, spike muhly, and alkali sacaton.

690 Millpaw-Datil complex, 0 to 7 percent slopes. This map unit is on low hills, on alluvial fans, and in swales. Areas are irregular in shape and are 200 to 3,000 acres in size. The present vegetation is grass and scattered pinyon and juniper trees. Elevation is 7,200 to 7,800 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 45 percent Millpaw loam, 0 to 7 percent slopes, and 45 percent Datil fine sandy loam, 1 to 7 percent slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of Albinas and Manzano soils. Included areas are throughout the unit and make up about 10 percent of the total acreage.

The Millpaw soil is deep and well drained. It formed in clayey alluvium. Typically, the surface layer is brown loam about 4 inches thick. The subsoil is brown clay loam and clay about 31 inches thick. The substratum to a depth of 60 inches or more is brown sandy clay loam.

Permeability of the Millpaw soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Datil soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown fine sandy loam about 3 inches thick. The subsoil is brown loam and gravelly clay loam about 19 inches thick. The substratum to a depth of 60 inches or more is pinkish gray loam and gravelly sandy clay loam.

Permeability of the Datil soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

This unit is used for livestock grazing and wildlife habitat. Some areas are used as woodland.

The potential natural plant community on the Millpaw soil is characterized mainly by western wheatgrass, spike muhly, blue grama, and bottlebrush squirreltail. When this soil receives additional moisture in the form of runoff from adjacent areas, production is significantly higher. As the plant community deteriorates, western wheatgrass and spike muhly decrease and there is an increase in plants such as blue grama, broom snakeweed, and rubber rabbitbrush. This soil is susceptible to invasion by pinyon and oneseed juniper.

The potential natural plant community on the Datil soil is characterized mainly by western wheatgrass, muttongrass, prairie junegrass, blue grama, and pinyon. Other important plants present in smaller amounts are oneseed juniper, bottlebrush squirreltail, and winterfat. The average annual production of air-dry vegetation ranges from 1,000 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, muttongrass, and prairie junegrass decrease and there is an increase in plants such as blue grama, fringed sagewort, pinyon, and juniper.

This unit is suited to such management practices as livestock watering developments, fencing, planned grazing systems, and proper grazing use. Brush management and rangeland seeding are suitable practices if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

This unit is poorly suited to the production of woodland products.

700 Hiarc-Loarc-Typic Ustorthents association, 1 to 9 percent slopes. This unit is on hills and alluvial fans. Areas are irregular in shape and are 1,000 to 7,500 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 7,600 to 8,100 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 35 percent Hiarc sandy loam, 1 to 5 percent slopes; 25 percent Loarc fine sandy loam, 1 to 9 percent slopes; and 20 percent Typic Ustorthents, 1 to 9 percent slopes. The Hiarc and Loarc soils are on alluvial fans, and the Typic Ustorthents are on dissected side slopes.

Included in this unit are small areas of sandstone Rock outcrop on ridges and Manzano soils in swales. Included areas make up about 20 percent of the total acreage.

The Hiarc soil is moderately deep and well drained. It formed in material derived dominantly from sandstone. Typically, the surface layer is brown sandy loam about 2 inches thick. The subsoil is pale brown and brown sandy clay loam and sandy loam about 17 inches thick. The substratum is pale brown gravelly sandy loam about 6 inches thick. White volcanic sandstone is at a depth of 25 inches.

Permeability of the Hiarc soil is moderate. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Loarc soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown fine sandy loam about 2 inches thick. The subsoil is dark brown sandy clay loam about 12 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy loam.

Permeability of the Loarc soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Typic Ustorthents are shallow to deep and are well drained. They formed dominantly in material derived from volcanic sandstone. In an example profile, the surface layer is light brown gravelly sandy loam about 1 inch thick. The underlying material is pale brown very gravelly sandy loam 16 inches thick. Volcanic sandstone is at a depth of 17 inches.

Permeability of the Typic Ustorthents is moderate to rapid. Available water capacity is very low to moderate. Effective rooting depth is 4 to 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is moderate to very high.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on this unit is characterized by blue grama, western wheatgrass, needleandthread, galleta, pinyon, and juniper. The average annual production of air-dry vegetation ranges from 875 pounds per acre in favorable years to 300 pounds in unfavorable years. If the plant community deteriorates, western wheatgrass and needleandthread decrease and there is an increase in plants such as blue grama, pinyon, rubber rabbitbrush, and juniper.

This unit is suited to such management practices as livestock watering developments, fencing, planned grazing systems, and proper grazing use. Brush management is feasible on this unit; clearcutting is not advisable, however, and the area treated should be deferred from grazing. Rangeland seeding is also a suitable practice on the soils in this unit if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and needleandthread.

This unit is well suited to the production of woodland products such as firewood and fenceposts. It produces 4 to 6 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

705 Parquat-Tafoya association, 5 to 30 percent slopes. This map unit is on hills, alluvial fans, and alluvial terraces. Areas are irregular in shape and are 300 to 7,500 acres in size. The present vegetation is pinyon and juniper trees and open areas of grass. Elevation is 7,600 to 8,100 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

This unit is 35 percent Parquat very cobbly sandy loam, 5 to 15 percent slopes, and 35 percent Tafoya gravelly sandy loam, 15 to 30 percent slopes. The Parquat soil is on hills and side slopes, and the Tafoya soil is on alluvial terraces, hills, and alluvial fans.

Included in this unit are small areas of Majada soils on side slopes, Motoqua soils that have slopes of more than 35 percent, and Manzano soils in drainageways. Included areas make up about 30 percent of the total acreage.

The Parquat soil is deep and well drained. It formed in alluvium. Typically, the surface layer is dark brown very cobbly sandy loam about 2 inches thick. The upper 10 inches of the subsoil is dark brown very gravelly clay loam, and the lower 7 inches is brown very cobbly clay loam. The upper 14 inches of the substratum is very pale brown very cobbly sandy loam, and the lower part to a depth of 60 inches or more is light yellowish brown very cobbly loamy coarse sand.

Permeability of the Parquat soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is high.

The Tafoya soil is deep and well drained. It formed in alluvium. Typically, the surface layer is dark brown stony loam about 3 inches thick. The subsoil is dark brown very gravelly clay loam about 22 inches thick. The substratum to a depth of 60 inches or more is light brown very gravelly sandy clay loam.

Permeability of the Tafoya soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used for livestock grazing, wildlife habitat, and woodland.

The potential natural plant community on the Parquat soil is characterized by pinyon, juniper, New Mexico feathergrass, blue grama, bottlebrush squirreltail, and galleta. Other important plants present in smaller amounts are muttongrass, prairie junegrass, and little bluestem. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, New Mexico feathergrass, bottlebrush squirreltail, and muttongrass decrease and there is an increase in plants such as blue grama, galleta, threeawn, pingue, pinyon, and juniper.

The potential natural plant community on the Tafoya soil is characterized by pinyon, juniper, blue grama, pine dropseed, and little bluestem. Other important plants present in smaller amounts are wolftail, bottlebrush squirreltail, and muttongrass. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 375 pounds in unfavorable years. As the plant community deteriorates, pine dropseed, little bluestem, and muttongrass decrease and there is an increase in plants such as blue grama, threeawn, pingue, pinyon, and juniper.

This unit is suited to such management practices as livestock watering developments, planned grazing systems, and proper grazing use. Installation of fences and livestock water pipelines is feasible on this unit but is difficult because of the steepness of slope and rock fragments. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

This unit is well suited to the production of woodland products such as firewood, fenceposts, Christmas trees, pinyon nuts, and ornamentals. It produces 5 to 7 cords of wood per acre. Clearcutting is not advisable because of the slow regeneration and growth of trees. To obtain a sustained stand of pinyon and juniper, selective thinning should be practiced.

710 Alegros-Alegros Variant complex, 1 to 10 percent slopes. This map unit is on mesa tops and alluvial plateaus. Areas are irregular in shape and are 100 to 1,000 acres in size. The present vegetation is pinyon and open areas of grass. Elevation is 7,500 to 8,200 feet. The average annual precipitation is about 15 to 18 inches, the average annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 120 days.

This unit is 60 percent Alegros cobbly loam and 20 percent Alegros Variant extremely cobbly loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of soils that either do not have a calcium carbonate accumulation, have a dark colored surface layer more than 7 inches thick, or have bedrock at a depth of 20 to 40 inches. Included areas are throughout the unit and make up about 20 percent of the total acreage.

The Alegros soil is deep and well drained. It formed in alluvium derived dominantly from basalt and andesite. Typically, the surface layer is brown cobbly loam about 2 inches thick. The subsoil is brown gravelly clay loam and gravelly clay about 19 inches thick. The upper 31 inches of the substratum is pinkish white extremely gravelly loamy sand and extremely gravelly coarse sandy loam, and the lower part to a depth of 60 inches or more is light brown extremely gravelly loamy coarse sand.

Permeability of the Alegros soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Alegros Variant soil is deep and well drained. It formed in alluvium derived dominantly from basalt and andesite. Typically, the surface layer is dark brown extremely cobbly loam 2 inches thick. The upper 9 inches of the subsoil is dark brown very cobbly clay loam, and the lower 8 inches is brown gravelly clay. The upper 12 inches of the substratum is pink cobbly sandy loam, and the lower part to a depth of 60 inches or more is pink cobbly loamy sand.

Permeability of the Alegros Variant soil is slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used mainly for livestock grazing and wildlife habitat. Some areas are used as woodland.

The potential natural plant community on this unit is characterized by blue grama, prairie junegrass, western wheatgrass, and pine dropseed. Other important plants present in smaller amounts are bottlebrush squirreltail and wolftail. Pinyon and alligator juniper are present in scattered stands. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 350 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass, bottlebrush squirreltail, and pine dropseed decrease and there is an increase in plants such as blue grama, threeawn, rubber rabbitbrush, and pinyon.

This unit is suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. Brush management and rangeland seeding are suitable practices on the Alegros soil if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of the cool-season grasses.

In some areas this unit is heavily infested by pinyon. These areas are well suited to the production of Christmas trees, pinyon nuts, and ornamentals.

715 Guy gravelly loamy fine sand, 0 to 12 percent slopes. This deep, well drained soil is on alluvial plains. It formed in alluvium. Areas are irregular in shape and are 150 to 7,000 acres in size. The present vegetation is grass. Elevation is 6,800 to 7,600 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is brown gravelly loamy fine sand about 3 inches thick. The subsoil is dark brown gravelly fine sandy loam about 9 inches thick. The substratum to a depth of 60 inches or more is white gravelly fine sandy loam.

Included in this unit are small areas of Dioxice and Manzano soils in depressional areas and Maia soils on side slopes leading to drainageways. Included areas make up about 30 percent of the total acreage.

Permeability of this soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is very high.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, western wheatgrass, sand dropseed, Indian ricegrass, and fourwing saltbush. The average annual production of air-dry vegetation ranges from 800 pounds per acre in favorable years to 225 pounds in unfavorable years. As the plant community deteriorates, western wheatgrass and Indian ricegrass decrease and there is an increase in plants such as blue grama, ring muhly, sand dropseed, and broom snakeweed.

This unit is suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. Rangeland seeding is a suitable practice if grazing is deferred. Grazing management should be designed to increase the productivity and reproduction of western wheatgrass and Indian ricegrass.

720 Gustspring gravelly fine sandy loam, 0 to 5 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from volcanic rock. Areas are broad and elongated and are 100 to 1,500 acres. The present vegetation is grass. Elevation is 6,800 to 7,200 feet. The average annual precipitation is about 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the average frost-free period is 115 to 130 days.

Typically, the surface layer is brown gravelly fine sandy loam 3 inches thick. The upper 14 inches of the subsoil is brown and dark brown gravelly sandy clay loam, and the lower 4 inches is pale brown gravelly sandy loam. The substratum to a depth of 60 inches or more is very pale brown extremely gravelly loamy coarse sand.

Included in this unit are small areas of Datil, Manzano, and Augustine soils and a soil that is similar to Gustspring soil but has a high rock fragment content. Included areas are throughout the unit. They make up about 20 percent of the total acreage.

Permeability of this soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding.

This unit is used for livestock grazing and wildlife habitat.

The potential natural plant community on this unit is characterized by blue grama, wolftail, bottlebrush squirreltail, and western wheatgrass. The average annual production of air-dry vegetation ranges from 900 pounds per acre in favorable years to 300 pounds in unfavorable years. As the plant community deteriorates, bottlebrush squirreltail and western wheatgrass decrease and there is an increase in plants such as blue grama, threeawn, sand dropseed, and broom snakeweed.

This unit is suited to such management practices as fencing, livestock watering developments, planned grazing systems, and proper grazing use. Grazing management should be designed to increase the productivity and reproduction of bottlebrush squirreltail and western wheatgrass.

Prime Farmland

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It must be used for producing either food or fiber or be available for these uses. Soil quality, length of growing season, and moisture supply are adequate to economically produce a sustained high yield of crops when managed properly. Prime farmland produces the highest yields with minimal energy and economic resources and causes the least disturbance to the environment. There is no prime farmland in the survey area.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Rangeland

By Darrel Reasner, district conservationist, Soil Conservation Service.

Rangeland is land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. In areas that have similar climate and topography, the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on knowledge about the relationship between the soils and vegetation and water.

The potential natural plant community and the average annual production of vegetation in favorable and unfavorable years is given for each soil in the section "Detailed Soil Map Units."

The potential natural plant community is the association of plants that are best adapted to a unique combination of environmental factors. Even on the same soil, the proportion of these plants varies from place to place and from year to year. The dominant plant or plants are used to characterize the plant community because of their relative stability in areas where abnormal disturbance or deterioration has not occurred. The grasses, forbs, and shrubs that characterize the potential natural plant community on each major soil are listed by common name.

Once the plant community has been characterized for each soil, similar plant communities are grouped into range sites. A range site is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from other natural plant communities in kind, amount, or proportion of range plants. Soil properties that have the greatest influence on the productivity of range plants are those that affect the availability of moisture and plant nutrients. Other soil properties, such as soil reaction, salt content, and the presence or absence of a high water table during any period of the year, are also important factors in differentiating range sites. Range site descriptions can be used to identify the proportions of the total annual production of each plant. Information on the range sites in this survey area is available in the local office of the Soil Conservation Service.

The average annual production is the amount of air-dry vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. The total production that can be used for forage depends upon the kind of grazing animals, the season of use, and other factors. The average annual production includes the current years growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable and unfavorable years. In a favorable year, the amount and distribution of precipitation and the soil and air temperatures make growing conditions substantially better than average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition ratings (excellent, good, fair, and poor) are determined by comparing the present plant community with the potential natural plant community in a particular range site. The more closely the existing community resembles the potential community, the better the range condition.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

About 90 percent of the survey area is rangeland or grazable woodland that produces grasses, forbs, and shrubs that are suitable for grazing by livestock. Cow and calf operations are the dominant kind of ranch unit, but many yearling operations are conducted in the survey area. Livestock produced on these ranches provide the principal income in the survey area.

Management of grazing to increase ground cover, accumulate litter, and improve the vigor and growth of the more productive grasses and shrubs is highly desirable. Continuous yearlong grazing or grazing the same pasture during the growing season every year results in deterioration of the plant community and reduces its value for livestock grazing, watershed protection, wildlife habitat, erosion control, and esthetic purposes.

A proper degree of grazing use, combined with deferred grazing or a planned grazing system that varies the season of grazing in pastures during successive years, is needed to obtain or maintain a healthy, balanced plant community.

Flexibility in livestock and wildlife numbers and in the frequency and intensity of grazing is essential to the success of any type of grazing program from yearlong stocking to the most intensive systems.

Woodland Management and Productivity

By Darrel Reasner, district conservationist, Soil Conservation Service.

About 526,468 acres in the survey area is woodland. The majority of the woodland is in pinyon and juniper.

The main timber producing soils are the Typic Argiborolls and the Midnight and Tolman soils. Ponderosa pine is the major commercial species in the survey area. Other important woodland soils are the Adman, Amenson, Montoqua, Dioxice, Faraway, Flugle, Hiarc, Lapdun, Majada, and Smilo soils and the Tolman soils on south-facing side slopes.

Pinyon and juniper are common at elevations of 6,000 to 10,250 feet. Although pinyon and juniper have not been considered commercial species, they are used extensively for fenceposts, firewood, and ornamental uses. Pinyon is also used as Christmas trees and for the production of edible pinyon nuts. The demand for pinyon and juniper continues to increase. Most of the pinyon and juniper areas are used extensively as grazable woodland. Many stands of pinyon and juniper are very dense and should be thinned to obtain maximum production of wood and forage.

Woodland Understory Vegetation

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some woodland, if well managed, can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

The total production of understory vegetation includes the herbaceous plants and the leaves, twigs, and fruit of woody plants up to a height of 4.5 feet. It is expressed in pounds per acre of air-dry vegetation in favorable, normal, and unfavorable years. In a favorable year, soil moisture is above average during the optimum part of the growing season; in a normal year, soil moisture is average; and in an unfavorable year, it is below average.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Environmental and farmstead plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service, the New Mexico State Forestry Division, or the Cooperative Extension Service or from a nursery.

Recreation

The soils of the survey area are rated in table 3 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent, the susceptibility of the soil to compaction, and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding, which may occur during the months of May through September. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 3, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 3 can be supplemented by other information in this survey, for example, interpretations for dwellings without basements and for local roads and streets in table 5 and interpretations for septic tank absorption fields in table 6.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

By William J. Stone, area geologist, Soil Conservation Service.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 4, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, New Mexico feathergrass, goldenrod, Rocky Mountain bee plant, western wheatgrass, and blue grama.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are ponderosa pine, spruce, fir, pinyon, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountainmahogany, bitterbrush, fourwing saltbush, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, saltgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include harlequin quail, pheasant, meadowlark, field sparrow, and cottontail.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants, or both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, Albert's squirrel, gray fox, mountain lion, elk, deer, and black bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, voles, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, coyote, horned lark, meadowlark, and lark bunting.

Engineering

By Robert P. Henrich, engineer, Soil Conservation Service.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 5 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 6 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 6 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 6 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage because of rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 6 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 7 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink- swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 7, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a *probable* source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an *improbable* source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 8 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect terraces and diversions and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features listed in tables are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 9 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area (*9*). Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Taxonomic Units and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 10 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to absorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average loss of soil by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (up to 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water erosion that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility of soil to soil blowing and the amount of soil lost. Soils are grouped according to the amount of stable aggregates 0.84 millimeters in size. These are represented idealistically by USDA textural classes. Soils containing rock fragments can occur in any group.

1. Sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony, cobbly, or gravelly soils and other soils not subject to soil blowing.

Soil and Water Features

Table 11 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 11 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*12*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 12 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Ustalf (*Ust*, meaning burnt, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplustalfs (*Hapl*, meaning minimal horizonation, plus *ustalfs*, the suborder of the Alfisols that have an ustic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aridic* identifies the subgroup that is drier than the great group. An example is Aridic Haplustalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Aridic Haplustalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Taxonomic Units and Their Morphology

In this section, each taxonomic unit recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each taxonomic unit. A pedon, a small three-dimensional area of soil, that is typical of the taxonomic unit in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (*10*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*12*). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each taxonomic unit are described in the section "Detailed Soil Map Units."

Abrazo Series

The soils in the Abrazo series are classified as fine, mixed, mesic Aridic Argiustolls. These moderately deep, well drained soils formed in residuum and alluvium derived from tuff. They are on hills, ridges, and alluvial fans. Slope is 2 to 50 percent. Elevation is 6,500 to 8,600 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 120 to 160 days.

Typical pedon of an Abrazo gravelly loam in an area of Abrazo-Rock outcrop complex, 15 to 50 percent slopes;

about 30 miles southeast of Datil, along New Mexico Highway 78; in the SE1/4 of sec. 34, T. 6 S., R. 9 W.

A1 0 to 4 inches; brown (7.5YR 4/2) gravelly loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 30 percent pebbles; neutral; clear smooth boundary.
B1 4 to 9 inches; dark brown (7.5YR 4/3) cobbly loam, dark brown (7.5YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many fine and very fine roots; 20 percent cobbles and 10 percent pebbles; neutral; clear smooth boundary.
B21t 9 to 15 inches; dark reddish brown (5YR 3/4) cobbly clay, dark reddish brown (5YR 3/3) moist; strong fine and medium subangular blocky structure; very hard, very firm, sticky and plastic; common fine and very fine roots; many moderately thick clay films on faces of peds; 10 percent cobbles and 10 percent pebbles; neutral; clear smooth boundary.
B22t 15 to 28 inches; reddish brown (5YR 4/4) cobbly clay, dark reddish brown (5YR 3/4) moist; strong fine and medium subangular blocky structure; very hard, very firm, sticky and plastic; common fine and very fine roots; many moderately thick clay films on faces of peds; 10 percent cobbles and 10 percent pebbles; mildly alkaline; abrupt wavy boundary.
C1ca 28 to 33 inches; reddish yellow (7.5YR 8/6) cobbly clay loam, reddish yellow (7.5YR 7/6) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine and very fine roots; 10 percent cobbles and 10 percent pebbles; disseminated lime; violently effervescent; mildly alkaline; abrupt wavy boundary.
R 33 inches; hard tuff.

The solum is 20 to 32 inches thick. Depth to bedrock is 20 to 40 inches. Content of rock fragments ranges from 1 to 35 percent.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when dry or moist.

The B2t horizon has hue of 5YR or 7.5YR, value of 3 or 4 when dry, and chroma of 2 to 4 when dry or moist. The fine earth fraction is clay or clay loam.

The C horizon has hue of 5YR or 7.5YR, value of 5 to 8 when dry and 3 to 7 when moist, and chroma of 4 to 6 when dry or moist.

Adman Series

The soils in the Adman series are classified as clayey, mixed Lithic Argiborolls. These shallow, well drained soils formed in residuum derived from basalt and basaltic tuff. They are on basalt flows, hills, and side slopes. Slope is 2 to 15 percent. Elevation is 7,400 to 8,400 feet. The average annual precipitation is 16 to 20 inches. The average annual air temperature is 40 to 46 degrees F, and the frost-free period is 80 to 120 days.

Typical pedon of an Adman cobbly loam in an area of Smilo-Adman complex, 0 to 9 percent slopes; about 15 miles south of Old Horse Springs; in the NW1/4NW1/4 of sec. 34, T. 7 S., R. 13 W.

A1 0 to 2 inches; dark brown (10YR 4/3) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine platy structure and weak fine granular; soft, very friable, nonsticky and slightly plastic; common fine and very fine roots; 10 percent pebbles, 10 percent cobbles, and 10 percent stones; slightly acid; abrupt smooth boundary.
B21t 2 to 5 inches; dark yellowish brown (10YR 3/4) cobbly clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common fine and very fine roots; few thin clay films on faces of peds; 15 percent pebbles, 10 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.
B22t 5 to 9 inches; dark brown (10YR 3/3) cobbly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine and common very fine roots; few thin clay films on faces of peds; 15 percent pebbles, 10 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.
B23t 9 to 15 inches; dark yellowish brown (10YR 4/4) cobbly clay, dark brown (10YR 3/3) moist; moderate fine angular blocky structure; hard, firm, sticky and plastic; few fine and very fine roots; common thick clay films on faces of peds; 10 percent pebbles, 10 percent cobbles, and 5 percent stones; neutral; abrupt wavy boundary.
R 15 inches; basalt.

Depth to bedrock is 10 to 20 inches. Content of rock fragments ranges from 15 to 35 percent.

The A horizon has value of 3 or 4 when dry and 2 or 3 when moist, and it has chroma of 1 to 3 when dry or moist. It is cobbly loam or stony loam.

The B horizon has hue of 7.5YR or 10YR, value of 3 or 4 when dry and 2 to 4 when moist, and chroma of 2 to 4 when dry or moist. It is cobbly clay loam or cobbly clay.

Albinas Series

The soils in the Albinas series are classified as fine-loamy, mixed, mesic Pachic Argiustolls. These deep, well drained soils formed in alluvium derived from basalt and volcanic sediment. They are on alluvial fans and in drainageways. Slope is 1 to 5 percent. Elevation is 7,000 to 7,800 feet. The average annual precipitation is 12 to

15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of an Albinas sandy loam in an area of Albinas-Datil complex, 1 to 5 percent slopes; about 4 miles east of Red Hill; in the NW1/4 of sec. 3, T. 1 S., R. 19 W.

A1 0 to 2 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak medium platy structure and weak fine granular; loose, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear smooth boundary.

B21t 2 to 9 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few thin clay films in pores; neutral; clear smooth boundary.

B22t 9 to 17 inches; brown (10YR 4/3) sandy clay loam, dark brown (10YR 3/3) moist; strong coarse subangular blocky and prismatic structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few thin clay films on faces of peds; mildly alkaline; clear smooth boundary.

B23tca 17 to 23 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common thin clay films on faces of peds; strongly effervescent; moderately alkaline; clear wavy boundary.

B31ca 23 to 34 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few fine and very fine roots; violently effervescent; strongly alkaline; clear smooth boundary.

B32ca 34 to 45 inches; brown (10YR 5/3) loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few fine and very fine roots; violently effervescent; strongly alkaline; clear smooth boundary.

C1 45 to 63 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; hard, firm, slightly sticky and slightly plastic; few very fine roots; strongly effervescent; moderately alkaline.

The solum is 22 to 45 inches thick.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry and 2 or 3 when moist, and chroma of 3 when dry and 2 or 3 when moist.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when dry or moist. It is sandy clay loam, loam, or clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 4 when dry or moist. It is sandy clay loam, loam, clay loam, or sandy loam.

Alegros Series

The soils in the Alegros series are classified as clayey over sandy or sandy-skeletal, montmorillonitic, mesic Typic Haplustalfs. These deep, well drained soils formed in alluvium derived from basaltic or andesitic lava. They are on mesas and small plateaus. Slope is 1 to 10 percent. Elevation is 7,500 to 8,200 feet. The average annual precipitation is 15 to 18 inches. The average annual air temperature is 45 to 50 degrees F, and the frost-free period is 100 to 120 days.

Typical pedon of an Alegros cobbly loam in an area of Alegros-Alegros Variant complex, 1 to 10 percent slopes; about 11 miles north of Old Horse Springs and 0.25 mile north of Nester Draw; in the NE1/4 of sec. 6, T. 3 S., R. 13 W.

A1 0 to 2 inches; brown (7.5YR 5/4) cobbly loam, dark brown (7.5YR 3/3) moist; weak fine platy structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; few fine roots and many very fine roots; 10 percent pebbles and 10 percent cobbles; neutral; clear smooth boundary.

B21t 2 to 5 inches; brown (7.5YR 4/4) gravelly clay loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; few medium roots, common fine roots, and many very fine roots; few thin clay films on faces of peds; 20 percent pebbles and 5 percent cobbles; neutral; clear smooth boundary.

B22t 5 to 10 inches; brown (7.5YR 4/4) gravelly clay, brown (7.5YR 4/4) moist; strong fine subangular blocky structure; hard, firm, sticky and very plastic; few coarse and medium roots and common fine and very fine roots; few thin clay films on faces of peds and in pores; 20 percent pebbles and 5 percent cobbles; mildly alkaline; clear wavy boundary.

B23t 10 to 21 inches; strong brown (7.5YR 4/6) gravelly clay, brown (7.5YR 4/4) moist; weak medium prismatic structure parting to strong medium and coarse subangular blocky; very hard, firm, sticky and very plastic; common fine and very fine roots; common thin clay films on faces of peds; 25 percent pebbles and 5 percent cobbles; mildly alkaline; clear wavy boundary.

IIC1ca 21 to 34 inches; pinkish white (7.5YR 8/2) extremely gravelly loamy sand, light brown (7.5YR 6/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine and very fine roots; 50 percent pebbles, 10 percent cobbles, and 5 percent stones; disseminated lime; violently effervescent; 45

percent calcium carbonate equivalent; moderately alkaline; gradual wavy boundary.

IIC2ca 34 to 52 inches; pink (7.5YR 7/4) extremely gravelly coarse sandy loam, light brown (7.5YR 6/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine and very fine roots; 50 percent pebbles, 10 percent cobbles, and 5 percent stones; lime in horizontal seams; violently effervescent; 40 percent calcium carbonate equivalent; moderately alkaline; clear wavy boundary.

IIC3ca 52 to 60 inches; light brown (7.5YR 6/4) extremely gravelly loamy coarse sand, brown (7.5YR 4/4) moist; massive;hard, firm, nonsticky and nonplastic; few fine and very fine roots; 50 percent pebbles, 10 percent cobbles, and 5 percent stones; disseminated lime; strongly effervescent; 8 percent calcium carbonate equivalent; moderately alkaline.

The solum is 20 to 31 inches thick. Depth to the calcic horizon is 16 to 28 inches.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 15 to 35 percent.

The B horizon has value of 4 or 5 when dry and 3 or 4 when moist, and it has chroma of 4 to 6 when dry or moist. Content of rock fragments ranges from 15 to 30 percent. The fine earth fraction is clay loam or clay and averages more than 35 percent clay.

The Cca horizon has hue of 7.5YR or 10YR, value of 6 to 8 when dry and 4 to 6 when moist, and chroma of 2 to 4 when dry or moist. Content of rock fragments ranges from 35 to 85 percent. The fine earth fraction is coarse sandy loam, loamy sand, or loamy coarse sand. Calcium carbonate equivalent ranges from 30 to 60 percent, decreasing below a depth of 50 inches.

Alegros Variant

The Alegros Variant soils are classified as clayey-skeletal, montmorillonitic, mesic Typic Haplustalfs. These deep, well drained soils formed in alluvium derived from basaltic or andesitic lava. They are on mesa tops and small plateaus. Slope is 1 to 10 percent. Elevation is 7,500 to 8,200 feet. The average annual precipitation is 15 to 18 inches. The average annual air temperature is 45 to 50 degrees F, and the frost-free period is 100 to 120 days.

Typical pedon of an Alegros Variant extremely cobbly loam in an area of Alegros-Alegros Variant complex, 1 to 10 percent slopes; about 11 miles north of Old Horse Springs; in the NW1/4NW1/4 of sec. 19, T. 1 S., R. 13 W.

A1 0 to 2 inches; dark brown (7.5YR 4/3) extremely cobbly loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; loose, slightly sticky and slightly plastic; few fine roots and common very fine roots; 20 percent pebbles, 40 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

B21t 2 to 11 inches; dark brown (7.5YR 3/4) very cobbly heavy clay loam, dark brown (7.5YR 3/4) moist; moderate fine subangular blocky structure; hard, very firm, sticky and plastic; few coarse and medium roots and common fine and very fine roots; common thin clay films on faces of peds and in pores; 20 percent pebbles, 15 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

B22t 11 to 19 inches; brown (7.5YR 5/4) gravelly clay, dark brown (7.5YR 3/4) moist; moderate fine subangular blocky structure; hard, very firm, sticky and plastic; common coarse roots, few medium and fine roots, and common very fine roots; common moderately thick clay films on faces of peds; 20 percent pebbles and 10 percent cobbles; mildly alkaline; gradual wavy boundary.

C1ca 19 to 31 inches; pink (7.5YR 8/4) cobbly sandy loam, pink (7.5YR 7/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine and very fine roots; 10 percent pebbles and 10 percent cobbles; violently effervescent; moderately alkaline; clear wavy boundary.

C2ca 31 to 60 inches; pink (7.5YR 8/4) cobbly loamy sand, pink (7.5YR 7/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; 10 percent pebbles and 10 percent cobbles; violently effervescent; strongly alkaline.

The solum is 19 to 35 inches thick.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry, and chroma of 2 or 3 when moist.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry and 3 or 4 when moist, and chroma of 4 to 6 when moist. Rock fragment content averages 35 to 60 percent. The fine earth fraction is clay loam or clay and is 35 to 50 percent clay.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 8 when dry and 4 to 7 when moist, and chroma of 0 to 6 when dry and 3 to 6 when moist. Content of rock fragments ranges from 15 to 35 percent. The upper part of the C horizon is loam, sandy loam, or coarse sandy loam, and the lower part is loamy sand or loamy coarse sand. Estimated calcium carbonate equivalent ranges from 20 percent to more than 70 percent.

Amenson Series

The Amenson series is classified as loamy, mixed, mesic, shallow Petrocalcic Paleustolls. These shallow, well drained soils formed in residuum derived from volcanic material. They are on hills, ridges, and mesas. Slope is 1 to 7 percent. Elevation is 7,000 to 7,800 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of an Amenson loam in an area of Ralphston-Amenson loams, 1 to 9 percent slopes; about 5 miles west of Quemado, along U.S. Highway 60; in the SE1/4NE1/4 of sec. 11, T. 1 N., R. 17 W.

A1 0 to 3 inches; dark brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium platy structure; loose, firm, slightly sticky and slightly plastic; many medium and fine roots and few very fine roots; mildly alkaline; clear smooth boundary.
B2t 3 to 11 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; strong medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common moderately thick clay films on faces of peds and in pores; slightly effervescent; mildly alkaline; clear smooth boundary.
B3ca 11 to 15 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 5/3) moist; weak coarse angular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few very fine and coarse roots; strongly effervescent; strongly alkaline; abrupt wavy boundary.
Ccam 15 inches; indurated caliche over basalt.

The solum is 10 to 15 inches thick.

The depth to the petrocalcic horizon is 6 to 20 inches. Content of rock fragments averages less than 35 percent.

The A horizon has chroma of 2 or 3 when dry or moist.

The B2t horizon has value of 4 or 5 when dry, and it has chroma of 2 or 3 when dry or moist.

Apache Series

The soils in the Apache series are classified as loamy, mixed, mesic Lithic Haplustolls. These shallow, well drained soils formed in residuum derived from volcanic conglomerate. They are on hills, ridges, and alluvial fans. Slope is 6 to 15 percent. Elevation is 7,000 to 8,200 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 120 to 160 days.

Typical pedon of an Apache gravelly sandy loam in an area of Abrazo-Apache complex, 2 to 15 percent slopes; about 27 miles southwest of Datil and 7 miles north of Old Horse Springs; in the NW1/4SW1/4 of sec. 26, T. 3 S., R. 13 W.

A1 0 to 3 inches; dark brown (10YR 4/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots and few fine roots; 5 percent cobbles and 15 percent pebbles; mildly alkaline; clear smooth boundary.
B2 3 to 10 inches; dark brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; common medium, fine, and very fine roots; 5 percent cobbles and 5 percent pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.
C 10 to 14 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable; common fine and very fine roots; 5 percent cobbles and 15 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.
R 14 inches; conglomerate.

The solum is 8 to 11 inches thick. Depth to bedrock is 11 to 20 inches.

The A horizon has value of 4 or 5 when dry, and it has chroma of 2 or 3 when dry or moist.

The B horizon has value of 4 or 5 when dry, and it has chroma of 2 to 4 when dry or moist. Content of rock fragments ranges from 0 to 10 percent.

The C horizon has value of 5 or 6 when dry, and it has chroma of 3 or 4 when dry or moist. Content of rock fragments ranges from 15 to 35 percent. The fine earth fraction is loam or sandy loam.

Aridic Argiustolls

Aridic Argiustolls are extremely variable. They are shallow to deep, well drained soils that formed in alluvium, colluvium, and residuum derived from volcanic material. These soils are on hills, ridges, and basalt-capped mesas. Slope is 15 to 45 percent. Elevation is 6,500 to 8,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Example pedon of Aridic Argiustolls in an area of Aridic Argiustolls-Rock outcrop complex, 15 to 45 percent slopes; about 6 miles southeast of Quemado; in the NW1/4NE1/4 of sec. 35, T. 1 N., R. 16 W.

A1 0 to 3 inches; grayish brown (10YR 5/2) stony loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots and few fine roots; 20 percent stones and 10 percent cobbles; mildly alkaline; abrupt smooth boundary.
B21t 3 to 17 inches; dark brown (10YR 4/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; few thin clay films on faces of peds; 10 percent stones, 20 percent cobbles, and 10 percent pebbles; mildly alkaline; gradual wavy boundary.
B22t 17 to 28 inches; dark brown (10YR 4/3) extremely stony clay loam, dark grayish brown (10YR 4/2) moist; weak fine angular blocky structure; hard,

friable, sticky and plastic; few very fine roots; common moderately thick clay films on faces of peds; 30 percent stones, 30 percent cobbles, and 10 percent pebbles; mildly alkaline; gradual wavy boundary.

C1 28 to 60 inches; light yellowish brown (10YR 6/4) extremely stony loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, nonplastic and slightly sticky; 60 percent stones, 20 percent cobbles, and 5 percent pebbles; slightly effervescent; moderately alkaline.

The profile is 5 to 60 inches thick. It is loamy sand to clay. It has hue of 2.5Y, 10YR, or 7.5YR. Calcium carbonate equivalent ranges from a trace to 35 percent. The mollic epipedon is 5 to 28 inches thick.

The A horizon is 20 to 70 percent stones, cobbles, and pebbles.

The B and C horizons are 5 to 85 percent rock fragments.

Aridic Ustochrepts

Aridic Ustochrepts are extremely variable. They are shallow to deep, well drained soils that formed in residual and alluvial material derived mainly from tuff and sandstone. These soils are on hills and ridges and in swales. Slope is 5 to 40 percent. Elevation is 6,900 to 8,700 feet. The average annual precipitation is 12 to 20 inches, the average annual air temperature is 40 to 54 degrees F, and the frost-free period is 80 to 160 days.

Example pedon of Aridic Ustochrepts in an area of Gustspring-Aridic Ustochrepts complex, 5 to 40 percent slopes; about 30 miles west of Quemado; in the SW1/4SE1/4 of sec. 23, T. 1 N., R. 21 W.

A1 0 to 3 inches; pale brown (10YR 6/3) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium granular structure; loose, very friable, nonsticky and slightly plastic; many fine roots; 15 percent pebbles; strongly effervescent; mildly alkaline; clear smooth boundary.

B2 3 to 10 inches; brown (10YR 5/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; loose, very friable, nonsticky and slightly plastic; many very fine roots; 5 percent cobbles and 15 percent pebbles; strongly effervescent; mildly alkaline; clear wavy boundary.

C1ca 10 to 26 inches; light gray (10YR 7/2) gravelly loam, yellowish brown (10YR 5/4) moist; massive; soft, friable, nonsticky and slightly plastic; common very fine and fine roots; 15 percent pebbles; violently effervescent; moderately alkaline; clear smooth boundary.

C2ca 26 to 60 inches; pink (7.5YR 7/4) gravelly loamy sand, light brown (7.5YR 6/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; 15 percent pebbles; violently effervescent; moderately alkaline.

The profile is 5 to 60 inches thick. It is loamy sand to clay loam. Hue is 7.5YR or 10YR. Calcium carbonate equivalent ranges from a trace to 35 percent.

The A horizon is 15 to 50 percent stones, cobbles, and pebbles.

The B and C horizons are 10 to 75 percent rock fragments.

Augustine Series

The soils in the Augustine series are classified as fine-loamy, mixed, mesic Aridic Haplustalfs. These deep, well drained soils formed in alluvium derived from volcanic material. They are on alluvial fans. Slope is 1 to 6 percent. Elevation is 6,500 to 7,500 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 120 to 160 days.

Typical pedon of Augustine fine sandy loam, 1 to 6 percent slopes; about 4 miles southeast of Datil; in the NW1/4SW1/4SW1/4 of sec. 16, T. 2 S., R. 9 W.

A1 0 to 3 inches; yellowish brown (10YR 5/4) fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine platy structure; slightly hard, very friable, nonsticky and nonplastic; few fine roots; mildly alkaline; clear smooth boundary.

B21t 3 to 9 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and slightly plastic; common fine roots; common thin clay films on faces of peds and as bridges; mildly alkaline; clear smooth boundary.

B22t 9 to 18 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; common fine roots; common thin clay films on faces of peds, as bridges, and in pores; mildly alkaline; clear smooth boundary.

B23tca 18 to 24 inches; light brown (7.5YR 6/4) clay loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure, very hard, firm, sticky and plastic; common fine roots; colloid stains; common medium soft masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

C1ca 24 to 60 inches; very pale brown (10YR 8/3) loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine roots; disseminated lime; strongly effervescent; moderately alkaline.

Content of rock fragments ranges from 5 to 15 percent. Calcium carbonate equivalent is less than 15 percent in the upper 40 inches of the profile.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, chroma of 3 or 4 when dry or moist. It is clay loam or loam.

The C horizon has hue of 7.5YR or 10YR, value of 7 or 8 when dry and 5 or 6 when moist, and chroma of 3 or 4 when dry or moist. It is loam or clay loam.

Bario Series

The soils in the Bario series are classified as fine, montmorillonitic Mollic Eutroboralfs. These deep, well drained soils formed in residuum derived from basalt and conglomerate. They are on upland plains. Slope is 0 to 5 percent. Elevation is 7,500 to 7,900 feet. The average annual precipitation is 16 to 20 inches. The average annual air temperature is 40 to 46 degrees F, and the frost-free period is 80 to 120 days.

Typical pedon of Bario sandy clay loam, 0 to 5 percent slopes; about 0.5 mile south of New Mexico Highway 78 and 3 miles east of the Gila Forest boundary, 600 feet south of a stock tank; in the NE1/4 of sec. 14, T. 8 S., R. 11 W.

A1 0 to 3 inches; brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 3/4) moist; weak fine granular and medium platy structure; soft, friable, slightly sticky and slightly plastic; many fine and medium roots; neutral; clear smooth boundary.

B21t 3 to 9 inches; reddish brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; weak medium and coarse subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots and common medium and fine roots; common moderately thick clay films on faces of peds and in pores; neutral; clear smooth boundary.

B22t 9 to 17 inches; reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; strong medium and coarse angular blocky structure; very hard, firm, sticky and plastic; few fine and very fine roots and common medium roots; many thick clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.

B23t 17 to 27 inches; reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; strong coarse and medium prismatic structure and medium angular blocky; very hard, firm, sticky and plastic; few fine and very fine roots; many thick clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.

B24tca 27 to 36 inches; yellowish red (5YR 4/6) clay, yellowish red (5YR 4/6) moist; strong coarse and medium angular blocky structure; hard, firm, sticky and plastic; few fine and very fine roots; common moderately thick clay films on faces of peds and in pores; strongly effervescent; moderately alkaline; clear smooth boundary.

B3ca 36 to 48 inches; reddish yellow (5YR 6/6) clay loam, reddish yellow (5YR 6/6) moist; moderate coarse subangular blocky structure; hard, firm, sticky and plastic; violently effervescent; strongly alkaline; clear smooth boundary.

Cca 48 to 60 inches; light reddish brown (5YR 6/4) clay, yellowish red (5YR 5/6) moist; massive; hard, firm, sticky and plastic; strongly effervescent; strongly alkaline.

Depth to lime is 27 to 50 inches.

The A horizon has value of 4 or 5 when dry and 3 or 4 when moist.

The B2t horizon has hue of 5YR or 7.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 4 or 6 when dry or moist. It is clay or clay loam and averages more than 35 percent clay.

The C horizon has hue of 5YR or 7.5YR, value of 6 or 7 when dry and 4 to 6 when moist, and chroma of 4 or 6 when dry or moist. Content of rock fragments ranges from 10 to 15 percent, and the fine earth fraction is clay or clay loam.

Brycan Series

The soils in the Brycan series are classified as fine-loamy, mixed, Cumulic Haploborolls. These deep, well drained soils formed in alluvium on alluvial fans, in broad drainageways, and in swales. Slope is 0 to 3 percent. Elevation is 6,800 to 8,000 feet. The average annual precipitation is 16 to 20 inches. The average annual air temperature is 40 to 46 degrees F,and the frost-free period is 80 to 120 days.

Typical pedon of Brycan loam, 0 to 3 percent slopes, about 5 miles west and 12 miles south of Pelona Mountain, in the NE1/4NE1/4 of sec. 22, T. 9 S., R. 13 W.

A1 0 to 4 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine platy structure and weak fine subangular blocky; slightly hard, friable, slightly sticky and nonplastic; few fine and very fine roots; mildly alkaline; clear smooth boundary.

B21 4 to 23 inches; brown (10YR 5/3) heavy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots, many fine roots, and few medium roots; mildly alkaline; clear smooth boundary.

B22 23 to 34 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots and common very fine roots; mildly alkaline; clear wavy boundary.

C1 34 to 49 inches; brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; mildly alkaline; clear wavy boundary.

C2 49 to 60 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; mildly alkaline.

The solum is 26 to 36 inches thick.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist.

The B horizon has value of 4 or 5 when dry, and it has chroma of 2 or 3 when dry or moist. It is clay loam or loam.

The C horizon has hue of 7.5YR or 10YR, and it has value of 4 or 5 when dry and 2 or 3 when moist.

Cabezon Series

The soils in the Cabezon series are classified as clayey, montmorillonitic, mesic Lithic Argiustolls. These shallow, well drained soils formed in residuum derived from basalt. They are on ridges, hills, and mesas. Slope is 3 to 25 percent. Elevation is 6,600 to 8,000 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Cabezon cobbly clay loam in an area of Cabezon-Thunderbird-Celsosprings complex, 3 to 25 percent slopes; about 6 miles south of U.S. Highway 60 and 7 miles east of the Arizona state line; in the NW1/4NE1/4SE1/4 of sec. 21, T. 2 S., R. 20 W.

A1 0 to 4 inches; dark brown (7.5YR 4/4) cobbly clay loam, dark brown (7.5YR 3/3) moist; weak fine platy structure and moderate fine granular; soft, friable, slightly sticky and slightly plastic; many fine and very fine roots; 20 percent cobbles; neutral; abrupt smooth boundary.

B21t 4 to 7 inches; reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/3) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; common fine roots; few thin clay films on faces of peds, as bridges, and in pores; neutral; clear smooth boundary.

B22t 7 to 19 inches; reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/3) moist; moderate fine and medium subangular blocky structure; very hard, firm, sticky and plastic; common very fine roots; few thin clay films on faces of peds, as bridges, and in pores; neutral; abrupt smooth boundary.

R 19 inches; basalt.

The solum is 10 to 19 inches thick. Content of rock fragments ranges from 10 to 25 percent. Depth to bedrock is 10 to 20 inches.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 or 3 when moist and 3 or 4 when dry. It is cobbly loam or cobbly clay loam.

The B horizon has hue of 5YR or 7.5YR, value of 3 to 5 when dry and 3 or 4 when moist, and chroma of 2 to 4 when dry or moist. It is clay or cobbly clay loam and is 10 to 25 percent rock fragments.

Catman Series

The soils in the Catman series are classified as very fine, montmorillonitic (calcareous), mesic Vertic Ustifluvents. These deep, well drained soils formed in fine textured alluvium. They are in swales, broad drainageways, and playas. Slope is 0 to 5 percent. Elevation is 6,000 to 7,600 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Catman clay in an area of Catman-Hickman complex, 1 to 5 percent slopes; about 9 miles west of Lake Armijo; in the SW1/4NW1/4NW1/4 of sec. 8, T. 3 N., R. 19 W.

A1 0 to 3 inches; pale brown (10YR 6/3) clay, brown (10YR 5/3) moist; moderate fine granular structure; slightly hard, friable, sticky and plastic; few very fine and fine roots; cracks 1 to 2 centimeters wide; strongly effervescent; mildly alkaline; abrupt smooth boundary.

C1 3 to 12 inches; pale brown (10YR 6/3) clay, yellowish brown (10YR 5/4) moist; strong coarse subangular blocky structure; slightly hard, friable, sticky and plastic; few fine and coarse roots and common very fine roots; cracks 1 to 2 centimeters wide; strongly effervescent; mildly alkaline; clear smooth boundary.

C2 12 to 30 inches; pale brown (10YR 6/3) clay, yellowish brown (10YR 5/4) moist; moderate coarse subangular blocky structure; hard, firm, very sticky and very plastic; few fine and coarse roots and common very fine roots; cracks 1 to 2 centimeters wide; violently effervescent; moderately alkaline; clear smooth boundary.

C3 30 to 43 inches; brown (10YR 5/3) clay, yellowish brown (10YR 5/4) moist; moderate coarse subangular blocky structure; hard, firm, very sticky and very platy; few very fine and fine roots; cracks 1 to 2 centimeters wide; strongly effervescent; mildly alkaline; clear smooth boundary.

IIC4 43 to 51 inches; pale brown (10YR 6/3) silty clay loam, yellowish brown (10YR 5/4) moist; moderate thin platy structure; hard, firm, very sticky and very plastic; few very fine and fine roots; violently effervescent; moderately alkaline; clear wavy boundary.

IIC5 51 to 60 inches; pale brown (10YR 6/3) clay loam, yellowish brown (10YR 5/4) moist; massive; hard, firm, sticky and plastic; common very fine roots; violently effervescent; moderately alkaline.

This soil averages more than 60 percent clay in the 10- to 40-inch control section.

The A horizon has hue of 10YR or 2.5Y, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 2 to 4 when dry and 3 or 4 when moist. It is silty clay, clay, or clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 2 to 4 when dry or moist. It commonly is silty clay, silty clay loam, clay loam, or clay, but it is silt loam below a depth of 40 inches in some pedons.

Celacy Series

The soils in the Celacy series are classified as fine-loamy, mixed, mesic Aridic Haplustalfs. These moderately deep, well drained soils formed in residuum derived from interbedded sandstone and shale. They are on plains, mesas, and ridges. Slope is 1 to 10 percent. Elevation is 6,300 to 7,700 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Celacy fine sandy loam in an area of Jacee-Celacy-Rock outcrop association, 0 to 9 percent slopes; 15 miles north of Pie Town; in the SW1/4NW1/4 of sec. 36, T. 3 N., R. 12 W.

A1 0 to 3 inches; light yellowish brown (10YR 6/4) fine sandy loam, brown (10YR 4/3) moist; weak thin platy structure parting to weak fine granular; soft, very friable, slightly sticky and nonplastic; few fine and very fine roots; mildly alkaline; clear smooth boundary.

B1 3 to 8 inches; dark yellowish brown (10YR 4/4) fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots and common very fine roots; mildly alkaline; clear smooth boundary.

B2t 8 to 22 inches; yellowish brown (10YR 5/6) sandy clay loam, yellowish brown (10YR 5/4) moist; moderate coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine and very fine roots; few thin clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.

C1 22 to 28 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; mildly alkaline; clear smooth boundary.

Cr 28 to 34 inches; soft decomposing sandstone over interbedded shale and sandstone.

The solum is 7 to 28 inches thick. Depth to bedrock is 20 to 40 inches. Content of rock fragments ranges from 0 to 15 percent.

The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist. It is sandy loam, fine sandy loam, loam, or loamy sand.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 3 to 6 when dry or moist. It is sandy clay loam, loam, or fine sandy loam.

The C horizon has hue of 10YR to 2.5Y, value of 5 to 7 when dry and 5 or 6 when moist, and chroma of 4 to 6 when dry and 4 when moist. It is sandy loam, fine sandy loam, or sandy clay loam.

Celsosprings Series

The soils in the Celsosprings series are classified as fine, mixed, mesic Aridic Argiustolls. These deep, well drained soils formed in alluvium derived from basalt and rhyolite on alluvial fans and mesas. Slope is 1 to 8 percent. Elevation is 7,000 to 8,000 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of Celsosprings loam, 1 to 8 percent slopes; about 7 miles west of Old Horse Springs; in the NW1/4NE1/4 of sec. 35, T. 4 S., R. 15 W.

A1 0 to 3 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable, sticky and slightly plastic; many very fine roots; 5 percent pebbles; slightly acid; abrupt smooth boundary.

B21t 3 to 7 inches; dark brown (7.5YR 4/4) heavy clay loam, dark brown (7.5YR 3/2) moist; moderate coarse and medium angular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots and few fine roots; few thin clay films on faces of peds and in pores; 5 percent pebbles; neutral; clear smooth boundary.

B22t 7 to 13 inches; dark brown (7.5YR 3/4) clay, dark brown (7.5YR 3/2) moist; strong coarse and medium angular blocky structure and moderate fine prismatic; hard, friable, sticky and plastic; few fine roots and common very fine and medium roots; common thin clay films on faces of peds and in pores; 10 percent pebbles; neutral; clear smooth boundary.

B23t 13 to 26 inches; yellowish red (5YR 5/6) cobbly heavy clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; few fine and very fine roots; few thin clay films on faces of peds; 10 percent pebbles and 10 percent cobbles; mildly alkaline; clear smooth boundary.

C1 26 to 33 inches; brown (7.5YR 5/4) gravelly light clay loam, dark brown (7.5YR 3/4) moist; massive; slightly hard, friable, sticky and plastic; few very fine roots; 15 percent pebbles and 5 percent cobbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C2 33 to 60 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; massive; soft, friable, sticky and slightly plastic; few very fine roots; 5 percent pebbles and 5 percent cobbles; slightly effervescent; mildly alkaline.

The solum is 26 to 47 inches thick.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry and 3 or 4 when moist, and chroma of 2 to 4 when dry or moist. It is stony loam, loam, or silt loam.

The B horizon has hue of 5YR to 10YR, value of 3 to 5 when dry and 3 or 4 when moist, and chroma of 2 to 6 when dry or moist. Content of rock fragments ranges from 0 to 35 percent, and the fine earth fraction is clay loam or clay.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 3 or 4 when dry or moist. Content of rock fragments ranges from 0 to 25 percent, and the fine earth fraction is loam or clay loam.

Ceniza Series

The soils in the Ceniza series are classified as cindery, mesic Pachic Haplustolls. These deep, well drained soils formed in residuum derived from volcanic ash and cinders. They are on upland plains near cinder cones. Slope is 1 to 15 percent. Elevation is 6,400 to 7,300 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Ceniza extremely gravelly loam in an area of Ceniza-Gatlin complex, 1 to 15 percent slopes; about 2 miles east of Lake Armijo; in the SE1/4SE1/4 of sec. 22, T. 3 N., R. 18 W.

A1 0 to 6 inches; grayish brown (10YR 5/2) extremely gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; loose, firm, slightly sticky and slightly plastic; many very fine and fine roots; 75 percent pebble-sized cinders; mildly alkaline; abrupt smooth boundary.

C1 6 to 18 inches; brown (10YR 5/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; massive; loose, firm, slightly sticky and slightly plastic; many very fine and fine roots; 55 percent pebble-sized cinders; moderately alkaline; clear smooth boundary.

C2 18 to 30 inches; brown (10YR 5/3) extremely gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; loose, firm, slightly sticky and slightly plastic; many very fine and fine roots; 60 percent pebble-sized cinders; moderately alkaline; clear smooth boundary.

C3 30 to 42 inches; very dark gray (10YR 3/1) cinders, black (10YR 2/1) moist; massive; 90 percent pebble-sized cinders; moderately alkaline; abrupt smooth boundary.

IIC1 42 to 60 inches; yellowish brown (10YR 5/6) sandy clay loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; moderately alkaline.

The mollic epipedon is 20 to 60 inches thick or more. The control section is 35 to 90 percent pebble-sized cinders.

The A horizon has chroma of 2 or 3 when dry or moist. It is more than 60 percent pebble-sized cinders.

The C horizon has value of 2 to 6 when dry and 2 to 4 when moist, and it has chroma of 1 to 3 when dry or moist. It is sandy loam or loam and is more than 35 percent pebble-sized cinders.

Coni Series

The soils in the Coni series are classified as loamy, mixed Lithic Argiborolls. These shallow, well drained soils formed in residuum derived from tuff. They are on long piedmont ridges. Slope is 10 to 35 percent. Elevation is 7,100 to 9,200 feet. The average annual precipitation is 16 to 20 inches. The average annual air temperature is 40 to 46 degrees F, and the frost-free period is 80 to 120 days.

Typical pedon of a Coni very gravelly sandy loam in an area of Coni-Tolman complex, 10 to 40 percent slopes; about 40 miles southwest of Datil; in the SE1/4NW1/4 of sec. 29, T. 8 S., R. 12 W.

A1 0 to 1 inch; dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, sticky and slightly plastic; many very fine and fine roots; 40 percent pebbles; neutral; abrupt smooth boundary.

B21t 1 to 8 inches; dark grayish brown (10YR 4/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many fine and very fine roots; few thin clay films on faces of peds; 20 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary.

B22t 8 to 12 inches; dark grayish brown (10YR 4/2) gravelly clay loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; common thin clay films on faces of peds; 20 percent pebbles and 5 percent cobbles; neutral; abrupt wavy boundary.

IIC1 12 to 15 inches; reddish yellow (7.5YR 6/6) extremely gravelly coarse sand, strong brown (7.5YR 5/6) moist; massive; hard, loose, nonsticky and nonplastic; few very fine roots; 65 percent pebbles; mildly alkaline; abrupt wavy boundary.

R 15 inches; hard tuff.

Thickness of the solum and depth to bedrock are 8 to 20 inches.

The A horizon has value of 3 to 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 35 to 60 percent.

The B horizon has hue of 7.5YR or 10YR, value of 2 to 4 when dry, and chroma of 2 to 4 when dry or moist. Content of rock fragments ranges from 10 to 25 percent. The fine earth fraction is loam or clay loam.

Datil Series

The soils in the Datil series are classified as fine-loamy, mixed, mesic Aridic Argiustolls. These deep, well drained soils formed in alluvium derived mainly from volcanic rock. They are on alluvial fans, plains, and hills and in drainageways. Slope is 1 to 20 percent. Elevation is 6,300 to 7,800 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Datil fine sandy loam in an area of Millpaw-Datil complex, 0 to 7 percent slopes; about 15 miles southwest of Quemado, on the road to Apache Creek; in the SE1/4SE1/4 of sec. 29, T. 1 S., R. 17 W.

A1 0 to 3 inches; brown (7.5YR 4/2) fine sandy loam, dark brown (7.5YR 3/2) when moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; mildly alkaline; abrupt smooth boundary.

B1 3 to 7 inches; brown (7.5YR 4/2) loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; mildly alkaline; clear wavy boundary.

B21t 7 to 10 inches; brown (7.5YR 4/2) gravelly clay loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and plastic; few fine roots and common very fine roots; common thin clay films in pores and on sand grains; about 15 percent pebbles; mildly alkaline; abrupt wavy boundary.

B22tca 10 to 22 inches; brown (7.5YR 4/4) gravelly clay loam, brown (7.5YR 4/4) moist; moderate coarse prismatic structure parting to strong medium subangular blocky; hard, very firm, sticky and plastic; few fine roots and common very fine roots; common thin clay films on faces of peds and sand grains; 20 percent pebbles; common medium masses of lime and a few small concretions; slightly effervescent; mildly alkaline; clear wavy boundary.

C1ca 22 to 40 inches; pinkish gray (7.5YR 6/2) loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; disseminated lime; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2ca 40 to 60 inches; pinkish gray (7.5YR 7/2) gravelly sandy clay loam, brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; about 30 percent pebbles; disseminated lime; violently effervescent; mildly alkaline.

The solum is 10 to 30 inches thick.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry, and chroma of 2 or 3 when moist. Content of rock fragments ranges from 10 to 30 percent. The fine earth fraction is fine sandy loam, loam, or sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 2 to 5 when moist, and chroma of 2 to 6 when dry or moist. Content of rock fragments ranges from 0 to 25 percent. The fine earth fraction is clay loam, sandy clay loam, or loam.

The C horizon has hue of 7.5YR or 10YR, value of 6 to 8 when dry and 4 to 8 when moist, and chroma of 1 to 4 when dry or moist. Coarse fragment content is 0 to 30 percent. The fine earth fraction is sandy loam, sandy clay loam, or loam. The C horizon has 6 to 40 percent calcium carbonate equivalent, but there is a prominent calcic layer that is more than 15 percent calcium carbonate equivalent.

Diatee Series

The soils in the Diatee series are classified as fine-loamy over sandy or sandy-skeletal, mixed, mesic Aridic Haplustalfs. These deep, well drained soils formed in gravelly alluvium derived mainly from volcanic material. They are on ridges and alluvial terraces. Slope is 1 to 5 percent. Elevation is 7,500 to 8,000 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Diatee gravelly sandy loam in an area of Diatee-Flugle association, 1 to 9 percent slopes; about 3 miles northwest of Pie Town; in the SE1/4NW1/4 of sec. 35, T. 2 N., R. 13 W.

A1 0 to 2 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; 15 percent pebbles and 5 percent cobbles; neutral; clear smooth boundary.

B21t 2 to 8 inches; dark brown (7.5YR 4/4) gravelly sandy clay loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; common medium, fine, and very fine roots and few coarse roots; few thin clay films on faces of peds and in pores; 15 percent pebbles and 5 percent cobbles; neutral; clear smooth boundary.

B22t 8 to 14 inches; brown (7.5YR 5/4) gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common medium and very fine roots and few coarse and fine roots; few thin clay films on faces of peds and in pores; 20 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary.

B23t 14 to 18 inches; brown (7.5YR 5/4) very gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky and plastic; common very fine roots and few fine and medium roots; few thin clay films on sand grains; 35 percent pebbles and 5 percent cobbles; slightly effervescent; neutral; clear wavy boundary.

IIC1 18 to 38 inches; light brown (7.5YR 6/4) very gravelly coarse sand, dark brown (7.5YR 4/4) moist; single grain; loose, nonsticky and nonplastic; common medium, fine, and very fine roots; 45 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary.

IIC2 38 to 60 inches; pink (7.5YR 7/4) very gravelly coarse sand, brown (7.5YR 5/4) moist; single grain; loose, nonsticky and nonplastic; common fine roots and few medium and very fine roots; 45 percent pebbles and 5 percent cobbles; mildly alkaline.

The solum is 14 to 28 inches thick. Depth to the sandy substratum is 12 to 28 inches.

The A horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 2 to 4 when dry or moist. Content of rock fragments ranges from 15 to 30 percent.

The B horizon has hue of 7.5YR or 10YR, and it has chroma of 3 or 4 when dry or moist. Content of rock fragments ranges from 15 to 50 percent. The fine earth fraction is clay loam, sandy clay loam, or sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 2 to 4 when dry or moist. Content of rock fragments ranges from 35 to 60 percent. The fine earth fraction is loamy coarse sand or coarse sand.

Dioxice Series

The soils in the Dioxice series are classified as fine-loamy, mixed, mesic Aridic Calciustolls. These deep, well drained soils formed in alluvium derived mainly from volcanic rock. They are on ridges and alluvial fans. Slope is 1 to 15 percent. Elevation is 7,000 to 7,600 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free season is 115 to 160 days.

Typical pedon of a Dioxice gravelly loam in an area of Datil-Dioxice association, moist, 3 to 15 percent slopes; about 0.5 mile west of Datil; in the NW1/4NE1/4 of sec. 10, T. 2 S., R. 10 W.

A1 0 to 2 inches; dark brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and plastic; common fine roots and many very fine roots; 25 percent pebbles; mildly alkaline; clear smooth boundary.

B2 2 to 7 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common fine and very fine roots; 10 percent pebbles; mildly alkaline; clear smooth boundary.

B3ca 7 to 25 inches; pinkish gray (7.5YR 7/2) gravelly loam, brown (7.5YR 5/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few coarse, medium, and fine roots; 20 percent pebbles; moderately alkaline; clear abrupt boundary.

C1ca 25 to 60 inches; pinkish white (7.5YR 8/2) very gravelly sandy loam, brown (7.5YR 5/2) moist; massive; soft, friable, slightly sticky and slightly plastic; few fine and very fine roots; 30 percent pebbles and 10 percent cobbles; moderately alkaline.

The solum is 20 to 26 inches thick.

The A horizon has value of 3 or 4 when dry. It is 15 to 30 percent gravel. The fine earth fraction is loam or sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 7 when dry and 3 to 5 when moist, and chroma of 2 to 4 when dry or moist. Content of rock fragments ranges from 0 to 25 percent pebbles. The fine earth fraction is loam or heavy sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 7 or 8 when dry and 5 or 6 when moist, and chroma of 2 to 4 when dry or moist. It is 10 to 40 percent pebbles. The fine earth fraction is loam or heavy sandy loam. This horizon has 20 to 35 percent calcium carbonate equivalent.

Faraway Series

The soils in the Faraway series are classified as loamy-skeletal, mixed, mesic, Lithic Haplustolls. These shallow, well drained soils formed in residuum derived mainly from volcanic material. They are on hills. Slope is 8 to 30 percent. Elevation is 7,200 to 7,800 feet. The average annual precipitation is 12 to 15 inches. The average air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Faraway very stony loam in an area of Faraway-Motoqua-Rock outcrop complex, 8 to 30 percent slopes; about 7 miles southeast of Datil; in the NW1/4NE1/4 of sec. 32, T. 2 S., R. 9 W.

A11 0 to 4 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; weak medium platy structure; soft, very friable, nonsticky and nonplastic; common fine roots; 25 percent stones and 30 percent pebbles; neutral; clear smooth boundary.

A12 4 to 8 inches; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; 20 percent cobbles and 20 percent pebbles; neutral; clear smooth boundary.

C1 8 to 12 inches; light yellowish brown (10YR 6/4) very cobbly loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; 25 percent cobbles and 25 percent pebbles; thin coatings of carbonates on rock fragments; slightly effervescent; mildly alkaline; abrupt wavy boundary.

R 12 inches; tuff.

The mollic epipedon is 7 to 14 inches thick. Depth to bedrock is 8 to 20 inches.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 40 to 60 percent.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 2 or 3 when moist, and chroma of 3 or 4 when dry or moist. Content of rock fragments ranges from 45 to 60 percent.

Flugle Series

The soils in the Flugle series are classified as fine-loamy, mixed, mesic Aridic Haplustalfs. These deep, well drained soils formed in alluvium. They are on alluvial fans, ridges, and hills. Slope is 2 to 15 percent. Elevation is 6,700 to 8,000 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Flugle sandy loam in an area of Loarc-Flugle-Manzano association, 1 to 9 percent slopes; about 5 miles north of Pie Town; in the SE1/4NW1/4 of sec. 25, T. 2 N., R. 13 W.

A1 0 to 3 inches; brown (7.5YR 5/2) sandy loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, friable, nonsticky and slightly plastic; few fine roots and common very fine roots; neutral; clear smooth boundary.

B21t 3 to 9 inches; brown (7.5YR 4/4) sandy clay loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; slightly hard, firm, slightly sticky and plastic; common fine and very fine roots; neutral; clear wavy boundary.

B22t 9 to 17 inches; brown (7.5YR 4/4) sandy clay loam, brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; common medium, fine, and very fine roots; few thin clay films on faces of peds; neutral; abrupt wavy boundary.

B3 17 to 29 inches; brown (7.5YR 5/4) light sandy clay loam, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few medium and fine roots and common very fine roots; neutral; clear smooth boundary.

C1 29 to 60 inches; light brown (7.5YR 6/4) sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine and very fine roots; disseminated lime; strongly effervescent; mildly alkaline.

The solum is 17 to 35 inches thick. Coarse fragment content is 0 to 10percent.

The A horizon has hue of 5YR to 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 3 to 5 when dry and 2 to 4 when moist. It is sandy loam, fine sandy loam, or loam.

The B horizon has hue of 5YR to 10YR, value of 3 to 6 when dry and 2 to 4 when moist, and chroma of 2 to 6 when dry and 3 or 4 when moist. It is sandy clay loam, clay loam, or loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 to 6 when moist, and chroma of 3 to 6 when dry or moist. It is sandy loam or fine sandy loam. A buried B horizon of clay loam or clay is in some pedons.

Gatlin Series

The soils in the Gatlin series are classified as cindery, mesic Aridic Haplustolls. These deep, well drained soils formed in residuum derived mainly from cinders and ash. They are on upland plains between small cinder cones. Slope is 1 to 15 percent. Elevation is 6,400 to 7,300 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Gatlin very gravelly loam in an area of Ceniza-Gatlin complex, 1 to 15 percent slopes; about 22 miles west of Quemado, along U.S. Highway 60; in the SW1/4NE1/4NW1/4 of sec. 10, T. 1 S., R. 19 W.

A1 0 to 4 inches; dark brown (10YR 3/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure and weak fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; 45 percent pebble-sized cinders; mildly alkaline; abrupt smooth boundary.

B2ca 4 to 10 inches; brown (10YR 5/3) very gravelly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 40 percent pebble-sized cinders; 5 percent calcium carbonate equivalent; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C1ca 10 to 11 inches; white (10YR 8/2) very gravelly loamy coarse sand, light yellowish brown (10YR 6/4) moist; weakly cemented layers or plates; very hard, very firm; 40 percent fine pebble-sized cinders; 35 percent calcium carbonate equivalent; violently effervescent; strongly alkaline; abrupt wavy boundary.

C2ca 11 to 16 inches; very pale brown (10YR 7/3) extremely gravelly loamy coarse sand, brown (10YR 5/3) moist; weakly cemented; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; 60 percent fine pebble-sized cinders; 6 percent calcium carbonate equivalent; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C3 16 to 28 inches; dark gray (10YR 4/1) extremely gravelly coarse sand, black (10YR 2/1) moist; single grain; loose, nonsticky and nonplastic; 65 percent fine pebble-sized cinders; moderately alkaline; abrupt smooth boundary.

C4 28 to 60 inches; very dark gray (10YR 3/1) extremely gravelly coarse sand, black (10YR 2/1) moist; single grain; loose, nonsticky and nonplastic; about 65 percent fine pebble-sized cinders; moderately alkaline.

The solum is 10 to 17 inches thick.

The A horizon has value of 3 to 5 when dry, and it has chroma of 2 or 3 when dry or moist. Cinder content ranges from 40 to 55 percent.

The B horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. Cinder content ranges from 35 to 45 percent. The fine earth fraction is loam or clay loam.

The C horizon has value of 4 to 7 when dry and 3 to 5 when moist, and it has chroma of 3 or 4 when dry or moist. Cinder content ranges from 40 to 75 percent. The fine earth fraction is loamy coarse sand or coarse sand.

Goesling Series

The soils in the Goesling series are classified as fine-loamy, mixed, mesic Aridic Haplustalfs. These deep, well drained soils formed in residuum and alluvium derived mainly from sandstone and shale. They are on ridges. Slope is 0 to 10 percent. Elevation is 6,400 to 6,800 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Goesling loamy sand in an area of Goesling-Celacy complex, 0 to 10 percent slopes; about 9 miles northwest of Lake Armijo; in the NE1/4NW1/4 of sec. 23, T. 4 N., R. 19 W.

A1 0 to 4 inches; light yellowish brown (10YR 6/4) loamy sand, brown (10YR 4/3) moist; weak fine granular structure; loose, very friable, nonsticky and nonplastic; many fine and very fine roots; neutral; clear smooth boundary.

B21t 4 to 8 inches; brown (7.5YR 5/4) light sandy clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and nonplastic; many very fine roots and common fine and medium roots; many very fine continuous pores; few thin clay films as bridges; neutral; clear smooth boundary.

B22tca 8 to 15 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and nonplastic; many very fine roots and common fine and medium roots; common very fine continuous pores; common thin clay films on faces of peds and in pores; disseminated calcium carbonate; slightly effervescent; mildly alkaline; clear wavy boundary.

B23tca 15 to 30 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; moderate fine and medium subangular blocky structure; very hard, firm, sticky and nonplastic; common very fine roots and few fine and medium roots; common very fine continuous pores; common thin clay films on faces of peds and in pores; disseminated calcium carbonate; 11 percent calcium carbonate equivalent; strongly effervescent; moderately alkaline; clear wavy boundary.

C1ca 30 to 42 inches;light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, sticky and slightly plastic; few very fine and fine roots; common very fine continuous pores; strongly effervescent; disseminated calcium carbonate; 14 percent calcium carbonate equivalent; moderately alkaline; clear wavy boundary.

C2ca 42 to 64 inches; very pale brown (10YR 7/4) heavy sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, sticky and nonplastic; few very fine and fine roots; few very fine continuous pores; disseminated calcium carbonate and many fine and medium irregular soft masses and seams of calcium carbonate; 16 percent calcium carbonate; strongly effervescent; moderately alkaline.

The solum is 20 to 35 inches thick. Content of rock fragments averages less than 5 percent.

The A horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4 when moist.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 3 or 4 when dry or moist. Texture is sandy clay loam or clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 6 or 7 when dry and 4 or 5 when moist, and chroma of 3 or 4 when dry or moist. Texture is sandy loam or sandy clay loam.

Goldust Series

The soils in the Goldust series are classified as clayey-skeletal, mixed, mesic Aridic Argiustolls. These deep, well drained soils formed in alluvium derived mainly from volcanic rock on alluvial fans. Slope is 2 to 8 percent. Elevation is 6,300 to 7,400 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of Goldust gravelly sandy clay loam, 2 to 8 percent slopes; about 9 miles east and 14 miles south of Luera Peak, in the SE1/4 of sec. 1, T. 8 S., R. 9 W.

A1 0 to 7 inches; dark brown (7.5YR 3/2) gravelly sandy clay loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and common very fine roots; 30 percent pebbles; neutral; clear smooth boundary.

B21t 7 to 15 inches; dark reddish brown (5YR 3/3) gravelly heavy clay loam, dark reddish brown (5YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; few medium and common fine and very fine roots; common moderately thick clay films on faces of peds; 30 percent pebbles; neutral; clear smooth boundary.

B22t 15 to 21 inches; reddish brown (5YR 4/3) very gravelly heavy clay loam, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots; common moderately thick clay films on faces of peds; 30 percent pebbles and 10 percent cobbles; mildly alkaline; clear smooth boundary.

B23tca 21 to 27 inches; yellowish red (5YR 4/6) very cobbly clay, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; few fine and very fine roots; common moderately thick clay films on faces of peds; 25 percent pebbles and 20 percent cobbles; strongly effervescent; moderately alkaline; abrupt irregular boundary.

Cca 27 to 60 inches; pink (5YR 7/4) very cobbly heavy sandy loam, light reddish brown (5YR 6/4) moist; massive; slightly hard, friable, slightly sticky and slightly plactic; few very fine roots; 20 percent pebbles and 25 percent cobbles; violently effervescent; moderately alkaline.

The solum is 20 to 37 inches thick.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4 when dry and 2 or 3 when moist, and chroma of 2 or 3 when dry or moist. Rock fragment content ranges from 15 to 35 percent.

The B horizon has hue of 5YR to 10YR, value of 3 to 5 when dry and 2 to 5 when moist, and chroma of 2 to 6 when dry or moist. Rock fragment content ranges from 35 to 60 percent. The texture of the fine earth fraction is heavy clay loam or clay.

The C horizon has hue of 5YR or 7.5YR, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 3 to 6 when dry or moist. Rock fragment content ranges from 40 to 70 percent.

Gustspring Series

The soils in the Gustspring series are classified as fine-loamy over sandy or sandy-skeletal, mixed, mesic Aridic Argiustolls. These deep, well drained soils formed in alluvium. They are on dissected alluvial fans and terraces. Slope is 0 to 15 percent. Elevation is 6,500 to 7,700 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Gustspring loamy sand in an area of Gustspring-Guy-Typic Ustorthents complex, 1 to 10 percent slopes; about 7 miles northwest of the Community of Red Hill; in the NW1/4NE1/4 of sec. 8, T. 1 N., R. 20 W.

A1 0 to 2 inches; brown (10YR 5/3) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; loose, very friable, nonsticky and nonplastic; many fine and very fine roots; 10 percent pebbles; neutral; abrupt smooth boundary.

B21t 2 to 8 inches; dark brown (10YR 3/3) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many fine and very fine roots; few thin clay films on faces of peds; 15 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary.

B3tca 8 to 11 inches; pale brown (10YR 6/3) gravelly sandy clay loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; few coarse roots and common medium, fine, and very fine roots; few thin clay films on faces of peds; 20 percent pebbles and 5 percent cobbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

C1ca 11 to 16 inches; white (10YR 8/2) gravelly loamy coarse sand, light gray (10YR 7/2) moist; massive; soft, very friable, slightly sticky and nonplastic; few fine roots and common very fine roots; 25 percent pebbles; violently effervescent; strongly alkaline; abrupt wavy boundary.

IIC2ca 16 to 22 inches; pinkish gray (7.5YR 7/2) gravelly loamy coarse and, pinkish gray (7.5YR 6/2) moist; massive; loose, nonsticky and nonplastic; few medium roots and common fine and very fine roots; 20 percent pebbles and 5 percent cobbles; violently effervescent; moderately alkaline; clear smooth boundary.

IIIC3ca 22 to 35 inches; pinkish gray (7.5YR 7/2) extremely gravelly loamy coarse sand, brown (7.5YR 5/4) moist; massive; loose, nonsticky and nonplastic; few medium and fine roots and common very fine roots; 45 percent pebbles and 20 percent cobbles; violently effervescent; moderately alkaline; gradual smooth boundary.

IVC4 35 to 60 inches; light brown (7.5YR 6/4) very gravelly coarse sand, dark brown (7.5YR 4/4) moist; massive; loose, nonsticky and nonplastic; few fine roots; 40 percent pebbles and 5 percent cobbles; mildly alkaline.

The solum is 9 to 20 inches thick. Depth to sandy or sandy-skeletal material is 11 to 35 inches.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry, and chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 5 to 60 percent. The fine earth fraction is loamy sand, sandy loam, fine sandy loam, or loam.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 6 when dry and 2 to 4 when moist, and chroma of 2 to 4 when dry or moist. Rock fragment content is 15 to 35 percent. The B horizon is sandy clay loam, loam, or clay loam and is 20 to 35 percent clay.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 8 when dry and 3 to 7 when moist, and chroma of 1 to 4 when dry or moist. Content of rock fragments ranges from 25 to 70 percent. The C horizon is loamy sand, loamy coarse sand, or coarse sand. Thin strata of sandy loam are in the upper part of the C horizon in some pedons. Calcium carbonate equivalent ranges from 15 to 35 percent.

Guy Series

The soils in the Guy series are classified as coarse-loamy, mixed, mesic Aridic Calciustolls. These deep, well drained soils formed in alluvium. They are on hills and plains. Slope is 0 to 15 percent. Elevation is 6,700 to 7,600 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 51 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Guy gravelly sandy loam in an area of Datil-Guy association, 3 to 15 percent slopes; about 12 miles southwest of Pie Town; in the SE1/4SE1/4 of sec. 21, T. 1 S., R. 14 W.

A1 0 to 3 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; 15 percent pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

B2 3 to 10 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak moderate subangular blocky structure; soft, friable, nonsticky and nonplastic; common very fine roots and few medium and fine roots; 15 percent pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

C1ca 10 to 24 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, friable, nonsticky and nonplastic; common medium roots and few very fine roots; 15 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

C2ca 24 to 29 inches; light gray (10YR 7/2) gravelly loam, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and medium roots; 15 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

C3ca 29 to 40 inches; white (10YR 8/2) gravelly loam, very pale brown (10YR 7/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 5 percent cobbles and 20 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

C4ca 40 to 60 inches; light gray (10YR 7/2) gravelly loam, brown (7.5YR 5/4) moist; massive; soft, friable, nonsticky and nonplastic; 5 percent cobbles and 20 percent pebbles; violently effervescent; moderately alkaline.

The solum is 10 to 15 inches thick.

The A horizon has value of 4 or 5 when dry. Content of rock fragments ranges from 15 to 35 percent. The fine earth fraction is sandy loam or loamy fine sand.

The B horizon has value of 4 or 5 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 15 to 35 percent. The fine earth fraction is sandy loam or fine sandy loam.

The Cca horizon has hue of 7.5YR or 10YR, value of 5 to 8 when dry and 4 to 7 when moist, and chroma of 1 to 4 when dry or moist. Content of rock fragments ranges from 15 to 35 percent. The fine earth fraction is loam, sandy loam, or fine sandy loam. Calcium carbonate equivalent ranges from 15 to 60 percent, and it decreases as depth increases.

Hiarc Series

The soils in the Hiarc series are classified as fine-loamy, mixed, mesic Aridic Argiustolls. These moderately deep, well drained soils formed in residuum and alluvium derived mainly from volcanic sandstone. They are on hills and alluvial fans. Slope is 1 to 5 percent. Elevation is 7,600 to 8,100 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Hiarc sandy loam in an area of Hiarc-Loarc-Typic Ustorthents association, 1 to 9 percent slopes; about 6 miles southeast of Pie Town; in the SE1/4NE1/4 of sec. 2, T. 1 S., R. 12 W.

A1 0 to 2 inches; pale brown (10YR 6/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; loose, very friable, nonsticky and nonplastic; few fine and very fine roots; 5 percent pebbles; neutral; abrupt smooth boundary.

B21 2 to 7 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; common coarse, fine, and very fine roots; 5 percent pebbles; neutral; clear wavy boundary.

B22t 7 to 12 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; strong fine subangular blocky structure parting to moderate fine and very fine subangular blocky; hard, firm, slightly sticky and slightly plastic; common coarse, fine, and very fine roots; few thin clay films on faces of peds; 5 percent pebbles; neutral; abrupt wavy boundary.

B3t 12 to 19 inches; pale brown (10YR 6/3) sandy clay loam, dark brown (10YR 3/3) moist; strong fine and very fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few very fine roots and common coarse and fine roots; continuous moderately thick clay films on faces of peds; 10 percent pebbles; neutral; clear smooth boundary.

C1 19 to 25 inches; pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; few coarse, medium, and fine roots; 25 percent pebbles; neutral; clear wavy boundary.

R 25 inches; white volcanic sandstone.

The solum is 17 to 32 inches thick. Depth to bedrock is 20 to 40 inches.

The A horizon has value of 5 or 6 when dry. Content of rock fragments ranges from 0 to 5 percent.

The B horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 5 to 15 percent. The fine earth fraction is sandy clay loam, sandy loam, or loam.

The C horizon has value of 5 to 7 when dry and 3 to 5 when moist, and it has chroma of 3 or 4 when dry or moist. Content of rock fragments ranges from 10 to 30 percent. The fine earth fraction is sandy clay loam or sandy loam.

Hickman Series

The soils in the Hickman series are classified as fine-loamy, mixed (calcareous), mesic Typic Ustifluvents. These deep, well drained soils formed in alluvium in swales and drainageways. Slope is 0 to 5 percent. Elevation is 6,000 to 7,600 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Hickman loam in an area of Typic Ustorthents-Hickman-Majada association, 1 to 25 percent slopes; about 3 miles southwest of Quemado; in the NE1/4NW1/4 of sec. 13, T. 1 N., R. 16 W.

A1 0 to 3 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; weak thin platy structure and weak very fine granular; loose, very friable, slightly sticky and plastic; common fine and very fine roots; slightly effervescent; mildly alkaline; abrupt smooth boundary.

C1 3 to 12 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; massive; soft, very friable, sticky and plastic; common fine and very fine roots; strongly effervescent; mildly alkaline; clear wavy boundary.

C2 12 to 19 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; massive; soft, very friable, sticky and plastic; common fine roots; strongly effervescent; mildly alkaline; clear wavy boundary.

C3 19 to 32 inches; brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; massive; loose, very friable, sticky and plastic; common fine roots; strongly effervescent; moderately alkaline; abrupt wavy boundary.

C4 32 to 62 inches; pale brown (10YR 6/3) heavy sandy loam, brown (10YR 4/3) moist; massive; loose, very friable, slightly sticky and nonplastic; strongly effervescent; moderately alkaline.

Content of rock fragments ranges from 0 to 15 percent. The 10- to 40-inch control section averages 18 to 35 percent clay.

The A horizon has hue of 7.5YR or 10YR. It is clay loam, loam, or very fine sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist. It is stratified clay loam, sandy clay loam, or loam. In some pedons the lower part of the C horizon is fine sandy loam or sandy loam and is 18 to 20 percent clay.

Hubbell Series

The soils in the Hubbell series are classified as ashy, mesic Aridic Argiborolls. These deep, well drained soils formed in material derived mainly from basaltic volcanic ash. They are on alluvial fans near volcanic craters. Slope is 1 to 9 percent.Elevation is 6,200 to 6,800 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of Hubbell loamy sand, 1 to 9 percent slopes; about 3 miles northwest of Lake Armijo; in the SW1/4NW1/4 of sec. 30, T. 3 N., R. 18 W.

A1 0 to 4 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, loose, nonsticky and nonplastic; few coarse roots, common fine roots, and many very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

C1 4 to 12 inches; light gray (10YR 7/2) sandy loam, grayish brown (10YR 5/2) moist; massive; loose, nonsticky and nonplastic; few coarse roots, common fine roots, and many very fine roots; violently effervescent; very strongly alkaline; clear smooth boundary.

C2 12 to 23 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) moist; massive; slightly hard, loose, nonsticky and nonplastic; few fine roots and many very fine roots; violently effervescent; very strongly alkaline; clear smooth boundary.

C3 23 to 31 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 3/3) moist; massive; slightly hard, loose, nonsticky and nonplastic; few fine and medium roots; violently effervescent; very strongly alkaline; clear smooth boundary.

C4 31 to 38 inches; pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; massive; slightly hard, loose, nonsticky and nonplastic; few fine and medium roots; violently effervescent; very strongly alkaline; clear smooth boundary.

C5 38 to 45 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, loose, nonsticky and nonplastic; few fine and medium roots; violently effervescent; very strongly alkaline; clear smooth boundary.

C6 45 to 60 inches; grayish brown (10YR 5/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, loose, nonsticky and nonplastic; few fine and medium roots; violently effervescent; very strongly alkaline.

The A and C horizons have hue of 10YR or 2.5Y, value of 4 to 7 when dry and 2 to 4 when moist, and chroma of 2 or 3 when dry or moist. In some pedons the C horizon has several thin strata that are weakly to strongly cemented with silica and calcium carbonate. Some pedons have strata that are slightly saline or moderately saline.

Jacee Series

The soils in the Jacee series are classified as fine, mixed, mesic Aridic Haplustalfs. These moderately deep, well drained soils formed in alluvium and residuum derived mainly from interbedded sandstone and shale. They are on alluvial fans and plains. Slope is 0 to 10 percent. Elevation is 6,300 to 7,700 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Jacee loam in an area of Jacee-Mion-Celacy association, 1 to 10 percent slopes; about 25 miles west of Quemado and 15 miles northwest of Red Hill; in the SE1/4NE1/4 of sec. 5, T. 2 N., R. 20 W.

A1 0 to 2 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium platy structure parting to moderate fine granular; soft, very friable, slightly sticky and slightly plastic; many fine roots and common very fine roots; neutral; abrupt smooth boundary.

B21t 2 to 4 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine and very fine roots; common thin clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.

B22t 4 to 12 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; strong coarse subangular blocky structure; hard, firm, sticky and plastic; few fine roots and common very fine roots; common thin clay films on faces of peds and in pores; mildly alkaline; clear wavy boundary.

B23tca 12 to 16 inches; light yellowish brown (10YR 6/4) silty clay, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; few fine roots and common very fine roots; few thin clay films on faces of peds and in pores; violently effervescent; 20 percent calcium carbonate equivalent; moderately alkaline; clear wavy boundary.

C1ca 16 to 24 inches; pale yellow (2.5Y 7/4) silty clay, light olive brown (2.5Y 5/4) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; violently effervescent; 23 percent calcium carbonate equivalent; moderately alkaline; clear wavy boundary.

Cr 24 inches; soft yellow shale that has platy structure but is easily cut with a spade and is underlain by firm to hard shale or sandstone.

The solum is 12 to 24 inches thick. Depth to bedrock is 20 to 40 inches. Content of rock fragments ranges from 0 to 10 percent.

The A horizon has value of 5 or 6 when dry and 3 to 5 when moist, and it has chroma of 3 or 4 when dry or moist.

The B horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry, and chroma of 2 to 4 when dry or moist. It is clay loam, silty clay loam, or clay and averages 35 to 50 percent clay.

The Cca horizon has hue of 10YR or 2.5Y, value of 6 or 7 when dry and 4 or 5 when moist, and chroma of 4 to 6 when dry or moist. It is clay or silty clay and is more than 40 percent clay. Calcium carbonate equivalent ranges from 15 to 25 percent.

Jacques Series

The soils in the Jacques series are classified as fine, mixed, mesic Cumulic Haplustolls. These deep, well drained soils formed in alluvium derived mainly from basalt and sandstone. They are in swales and drainageways. Slope is 1 to 5 percent. Elevation is 7,100 to 7,700 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of Jacques clay loam, 1 to 5 percent slopes; about 20 miles northeast of Quemado; in the NE1/4SE1/4 of sec. 23, T. 4 N., R. 14 W.

A1 0 to 5 inches; dark brown (10YR 3/3) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium and moderate fine granular structure; soft, very friable, sticky and plastic; many very fine roots and few fine roots; 5 percent pebbles; neutral; clear wavy boundary.

B21ca 5 to 9 inches; dark brown (7.5YR 4/2) silty clay loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure parting to strong fine angular blocky; slightly hard, friable, sticky and plastic; common very fine roots and few fine roots; 5 percent pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

B22ca 9 to 26 inches; dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure parting to moderate fine angular blocky; slightly hard, friable, sticky and very plastic; common very fine roots and few fine roots; 5 percent pebbles; slightly effervescent; moderately alkaline; gradual wavy boundary.

C1ca 26 to 52 inches; dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; massive; hard, friable, sticky and plastic; 5 percent pebbles; slightly effervescent; moderately alkaline; abrupt wavy boundary.

IIC2ca 52 to 60 inches; light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, slightly sticky and plastic; few very fine roots; 5 percent cobbles and 5 percent pebbles; strongly effervescent; moderately alkaline.

Thickness of the mollic epipedon is 29 to 54 inches. The solum is 17 to 31 inches thick. The 10- to 40-inch control section averages more than 35 percent clay.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when dry or moist.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when dry or moist. It is clay, silty clay loam, or silty clay.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 2 to 4 when dry or moist. It is silty clay, clay, silty clay loam, or clay loam. Some pedons have strata of material that is less than 35 percent clay.

Joachem Series

The soils in the Joachem series are classified as loamy, mixed, mesic Lithic Argiustolls. These shallow, well drained soils formed in residuum derived mainly from ash flow tuff. They are on hills and ridges. Slope is 3 to 15 percent. Elevation is 7,100 to 7,500 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 120 to 160 days.

Typical pedon of Joachem gravelly sandy loam in an area of Joachem-Rock outcrop complex, 3 to 15 percent slopes; about 2 miles north of Old Horse Springs; in the SE1/4NE1/4 of sec. 24, T. 4 S., R. 14 W.

A1 0 to 3 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots and few fine roots; 25 percent pebbles and 5 percent cobbles; mildly alkaline; abrupt smooth boundary.

B2t 3 to 8 inches; dark grayish brown (10YR 4/2) cobbly loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common fine and very fine roots; few thin clay films on faces of peds; 15 percent pebbles and 15 percent cobbles; moderately alkaline; clear wavy boundary.

C1 8 to 11 inches; pale brown (10YR 6/3) very cobbly light loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 20 percent pebbles and 20 percent cobbles; strongly alkaline; abrupt wavy boundary.

R 11 inches; rhyolitic tuff.

The solum is 6 to 13 inches thick. Depth to bedrock is 6 to 20 inches.

The A horizon has hue of 7.5YR or 10YR, and it has chroma of 2 or 3 when dry or moist.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry, and chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 15 to 35 percent. The fine earth fraction is sandy loam or loam and is 9 to 18 percent clay.

The C horizon has hue of 7.5YR or 10YR, value of 6 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist. Content of rock fragments averages 35 to 40 percent. The fine earth fraction is light loam or light sandy loam.

Lapdun Series

The soils in the Lapdun series are classified as loamy-skeletal, carbonatic, mesic Aridic Calciustolls. These deep, well drained soils formed in alluvium derived mainly from basalt lava. They are on alluvial fans. Slope is 0 to 8 percent. Elevation is 7,300 to 7,700 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Lapdun very cobbly loam in an area of Majada-Lapdun very cobbly loams, 1 to 8 percent slopes; about 6 miles south of Omega; in the SE1/4SW1/4 of sec. 10, T. 1 S., R. 15 W.

A1 0 to 2 inches; brown (10YR 4/3) very cobbly loam, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, slightly sticky and nonplastic; many fine roots and few very fine roots; 15 percent pebbles, 25 percent cobbles, and 5 percent stones; mildly alkaline; abrupt smooth boundary.

B2ca 2 to 10 inches; dark grayish brown (10YR 4/2) very cobbly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many medium, fine, and very fine roots; 10 percent pebbles, 15 percent cobbles, and 15 percent stones; about 12 percent calcium carbonate equivalent; strongly effervescent; moderately alkaline; clear smooth boundary.

B3ca 10 to 14 inches; grayish brown (10YR 5/2) very cobbly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and nonplastic; common medium roots and few fine and very fine roots; 10 percent pebbles and 25 percent cobbles; about 23 percent calcium carbonate equivalent; violently effervescent; moderately alkaline; clear wavy boundary.

C1ca 14 to 36 inches; light gray (10YR 7/2) very cobbly loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common coarse and medium roots and few fine and very fine roots; 10 percent pebbles, 25 percent cobbles, and 15 percent stones; about 55 percent calcium carbonate equivalent; violently effervescent; strongly alkaline; abrupt wavy boundary.

C2ca 36 to 60 inches; pink (7.5YR 7/4) very cobbly loamy sand, strong brown (7.5YR 5/6) moist; massive; extremely hard, very firm, nonsticky and nonplastic; 10 percent pebbles and 25 percent cobbles; about 7 percent calcium carbonate equivalent; slightly effervescent; moderately alkaline.

The solum is 7 to 27 inches thick. Content of rock fragments in the control section ranges from 35 to 60 percent.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry, and chroma of 2 or 3 when moist. Content of rock fragments ranges from 35 to 50 percent.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 35 to 60 percent. The fine earth fraction is loam or clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 8 when dry and 4 to 7 when moist, and chroma of 1 to 4 when dry and 2 to 6 when moist. Content of rock fragments ranges from 35 to 60 percent. The fine earth fraction is sandy loam, loam, or loamy sand.

Loarc Series

The soils in the Loarc series are classified as fine-loamy, mixed, mesic Aridic Argiustolls. These deep, well drained soils formed in alluvium and eolian material. They are on alluvial fans, low hills, and ridges. Slope is 0 to 9 percent. Elevation is 6,300 to 8,100 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Loarc sandy loam in an area of Datil-Loarc association, 1 to 15 percent slopes, about 11 miles east of Quemado, in the NW1/4SE1/4 of sec. 20, T. 1 N., R. 14 W.

A1 0 to 3 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; loose, very friable, nonsticky and nonplastic; common fine roots and few very fine roots; 10 percent pebbles; neutral; abrupt smooth boundary.

B21t 3 to 8 inches; dark brown (10YR 4/3) sandy clay loam, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; hard, friable, sticky and plastic; common very fine roots and few fine roots; few thin clay films on faces of peds and lining pores; 5 percent pebbles; neutral; clear wavy boundary.

B22t 8 to 19 inches; dark brown (10YR 4/3) sandy clay loam, dark brown (10YR 3/3) moist; hard, friable, sticky and slightly plastic; common very fine roots; few thin clay films on faces of peds; 5 percent pebbles; neutral; clear wavy boundary.

B3 19 to 26 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and nonplastic; 15 percent pebbles; mildly alkaline; abrupt wavy boundary.

C1ca 26 to 32 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine roots; 15 percent pebbles; slightly effervescent; mildly alkaline; clear wavy boundary.

C2ca 32 to 50 inches; pink (7.5YR 7/4) sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; 10 percent pebbles; strongly effervescent; 8 percent calcium carbonate equivalent; moderately alkaline; clear wavy boundary.

C3 50 to 60 inches; pink (7.5YR 7/4) loamy sand, pinkish gray (7.5YR 6/2) moist; massive; loose, very friable, nonsticky and nonplastic; 5 percent pebbles; mildly alkaline.

The solum is 14 to 26 inches thick. The mollic epipedon is 14 to 19 inches thick. Content of rock fragments in the profile ranges from 0 to 15 percent.

The A horizon has value of 4 or 5 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. It is sandy loam, fine sandy loam, or loamy sand.

The B horizon has hue of 7.5YR or 10YR, and it has chroma of 2 to 4 when dry or moist. It is sandy clay loam or sandy loam and is 18 to 30 percent clay.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 to 6 when moist, and chroma of 2 to 4 when dry or moist. It is sandy loam, loamy sand, or sandy clay loam. Some pedons have strata in the lower part of the C horizon that are 5 to 30 percent rock fragments.

Maia Series

The soils in the Maia series are classified as fine-loamy, mixed, mesic Aridic Haplustalfs. These deep, well drained soils formed in alluvium derived mainly from volcanic rock. They are on alluvial fans. Slope is 1 to 8 percent. Elevation is 6,900 to 7,300 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 120 to 160 days.

Typical pedon of Maia sandy loam, 1 to 8 percent slopes; about 5 miles west of Old Horse Springs; in the NW1/4 of sec. 14, T. 4 S., R. 14 W.

A1 0 to 5 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 4/4) moist; moderate medium platy structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; common fine roots and few very fine roots; 10 percent pebbles; neutral; clear smooth boundary.

B21t 5 to 10 inches; brown (7.5YR 4/4) sandy clay loam, brown (7.5YR 4/4) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable, sticky and slightly plastic; common very fine roots; few thin clay films in pores; 5 percent pebbles; neutral; clear smooth boundary.

B22t 10 to 17 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; strong fine subangular blocky structure; very hard, friable, sticky and slightly plastic; common very fine roots; common thin clay films on faces of peds and in pores; 5 percent pebbles and 5 percent cobbles; mildly alkaline; clear wavy boundary.

B23tca 17 to 23 inches; light brown (7.5YR 6/4) gravelly clay loam, strong brown (7.5YR 5/6) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few very fine roots; few thin clay films on faces of peds; 15 percent pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

C1ca 23 to 31 inches; pink (7.5YR 7/4) gravelly loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, sticky and slightly plastic; few very fine roots; 20 percent pebbles; strongly effervescent; strongly alkaline; clear wavy boundary.

C2ca 31 to 60 inches; light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine roots; 20 percent pebbles; strongly effervescent; strongly alkaline.

The solum is 16 to 37 inches thick. Depth to the calcic horizon ranges from 17 to 34 inches. Content of rock fragments ranges from 0 to 30 percent.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry, and chroma of 3 or 4 when dry or moist.

The B horizon has hue of 5YR or 7.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 4 to 6 when dry or moist. It is sandy clay loam, clay loam, or heavy loam and is 25 to 35 percent clay.

The C horizon has hue of 5YR or 7.5YR, value of 5 to 8 when dry and 3 to 6 when moist, and chroma of 2 to 6 when dry or moist.

Majada Series

The soils in the Majada series are classified as loamy-skeletal, mixed, mesic Aridic Argiustolls. These deep, well drained soils formed in alluvium derived mainly from basalt lava. They are on alluvial fans, hills, plains, and mesas. Slope is 1 to 25 percent. Elevation is 6,900 to 7,700 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period of 115 to 130 days.

Typical pedon of a Majada very cobbly loam in an area of Majada-Lapdun very cobbly loams, 1 to 8 percent slopes; about 6 miles southwest of Pie Town; in the SE1/4 of sec. 6, T. 1 S., R. 13 W.

A1 0 to 3 inches; brown (10YR 5/3) very cobbly loam, dark brown (10YR 3/3) moist; weak medium platy structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; common fine roots and few very fine roots; 20 percent pebbles, 20 percent cobbles, and 5 percent stones; mildly alkaline; abrupt smooth boundary.

B2t 3 to 14 inches; dark brown (10YR 4/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common medium and very fine roots; few thin clay films on faces of peds; 10 percent pebbles, 25 percent cobbles, and 10 percent stones; mildly alkaline; clear wavy boundary.

B3 14 to 21 inches; brown (10YR 5/3) very cobbly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable, sticky and slightly plastic; common coarse and medium roots and few fine and very fine roots; 15 percent pebbles, 20 percent cobbles, and 5 percent stones; about 12 percent calcium carbonate equivalent; slightly effervescent; moderately alkaline; abrupt wavy boundary.

C1ca 21 to 38 inches; white (10YR 8/1) very cobbly light loam, very pale brown (10YR 7/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common medium roots and few very fine roots; 15 percent pebbles, 20 percent cobbles, and 5 percent stones; about 65 percent calcium carbonate equivalent; violently effervescent; strongly alkaline; gradual wavy boundary.

C2ca 38 to 60 inches; white (10YR 8/1) very cobbly light loam, very pale brown (10YR 7/4) moist; massive; loose, slightly sticky and slightly plastic; few fine and very fine roots; 20 percent pebbles and 15 percent cobbles; about 35 percent calcium carbonate equivalent; violently effervescent; strongly alkaline.

The solum is 17 to 32 inches thick.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 35 to 50 percent. The fine earth fraction is loam or sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 2 to 4 when dry or moist. Content of rock fragments ranges from 35 to 50 percent. The fine earth fraction is clay loam, sandy clay loam, or loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 8 when dry and 4 to 7 when moist, and chroma of 1 to 3 when dry and 2 to 4 when moist. Content of rock fragments ranges from 35 to 70 percent. The fine earth fraction is loam or sandy loam. Some pedons have strata of loamy sand in the lower part of the C horizon. Calcium carbonate equivalent ranges from 25 to 65 percent.

Manzano Series

The soils in the Manzano series are classified as fine-loamy, mixed, mesic Cumulic Haplustolls. These deep, well drained soils formed in alluvium. They are on flood plains and in swales and drainageways. Slope is 0 to 2 percent. Elevation is 6,500 to 7,600 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Manzano loam in an area of Loarc-Flugle-Manzano association, 1 to 9 percent slopes; about 7 miles north of Pie Town; in the SW1/4NW1/4 of sec. 7, T. 2 N., R. 12 W.

A1 0 to 2 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; neutral; abrupt smooth boundary.

B21 2 to 7 inches; brown (10YR 5/3) loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots and few very fine roots; neutral; clear wavy boundary.

B22 7 to 22 inches; dark brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure; hard, firm, sticky and plastic; few fine and very fine roots; neutral; clear smooth boundary.

B3 22 to 35 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky and plastic; slightly effervescent; mildly alkaline; clear wavy boundary.

C1 35 to 60 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline.

The solum is 14 to 36 inches thick. The mollic epipedon is from 21 to 38 inches thick. Rock fragment content ranges from 5 to 15 percent. The 10- to 40-inch control section averages 18 to 34 percent clay.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. It is loam or clay loam.

The B horizon has value of 3 to 5 when dry and 2 or 3 when moist, and it has chroma of 2 to 4 when dry or moist. It is clay loam or loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 6 when moist, and chroma of 2 to 4 when dry or moist. It is clay loam or loam and is stratified in some pedons.

Midnight Series

The soils in the Midnight series are classified as loamy-skeletal, mixed, nonacid, frigid, shallow Typic Ustorthents. These shallow, well drained soils formed in colluvium derived mainly from sandstone and shale. They are on hills and ridges. Slope is 3 to 25 percent. Elevation is 7,600 to 8,200 feet. The average annual precipitation is 15 to 18 inches. The average annual air temperature is 40 to 45 degrees F, and the frost-free period is 80 to 115 days.

Typical pedon of a Midnight very gravelly loam in an area of Valnor-Midnight association, 1 to 25 percent slopes; about 18 miles northeast of Pie Town; in the NW1/4NW1/4 of sec. 23, T. 4 N., R. 10 W.

A1 0 to 3 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; common fine roots and many very fine roots; 40 percent pebbles, 10 percent cobbles, and 10 percent stones; neutral; clear wavy boundary.

C1 3 to 7 inches; pale brown (10YR 6/3) very cobbly clay loam, brown (10YR 5/3) moist; weak medium granular structure; slightly hard, friable, sticky and plastic; common medium, fine, and very fine roots; 25 percent pebbles and 15 percent cobbles; neutral; clear wavy boundary.

Cr 7 inches; light olive brown (2.5Y 5/4) soft shale.

Depth to soft bedrock ranges from 4 to 20 inches. Content of rock fragments in the profile ranges from 35 to 60 percent.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4 when moist, and chroma of 3 or 4 when dry or moist.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5 when moist, and chroma of 3 or 4 when dry or moist.

Millpaw Series

The soils in the Millpaw series are classified as fine, mixed, mesic Pachic Argiustolls. These deep, well drained soils formed in fine textured alluvium. They are on hills and alluvial fans and in swales. Slope is 0 to 7 percent. Elevation is 7,200 to 7,800 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Millpaw loam in an area of Millpaw-Datil complex, 0 to 7 percent slopes; about 12 miles west of Quemado; in the NE1/4NW1/4 of sec. 10, T. 1 N., R. 18 W.

A1 0 to 4 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak medium platy structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; mildly alkaline; abrupt smooth boundary.

B21t 4 to 10 inches; brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; common thin clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.

B22t 10 to 35 inches; brown (10YR 4/3) clay, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; common fine roots; common moderately thick clay films on faces of peds and in pores; mildly alkaline; abrupt smooth boundary.

C1ca 35 to 60 inches; brown (7.5YR 5/4) sandy clay loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; moderately alkaline.

The solum is 20 to 40 inches thick.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when dry or moist.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry and 2 to 4 when moist, and chroma of 2 to 4 when dry or moist. It is clay loam or clay and is 35 to 50 percent clay.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 4 to 6 when dry and 3 or 4 when moist.

Mion Series

The soils in the Mion series are classified as clayey, mixed (calcareous), mesic, shallow Ustic Torriorthents. These shallow, well drained soils formed in local alluvium and residuum derived mainly from sandstone and shale. They are on ridges, hills, and plains. Slope is 1 to 30 percent. Elevation is 6,300 to 7,800 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Mion gravelly clay loam in an area of Mion-Travessilla-Rock outcrop complex, 2 to 30 percent slopes, about 24 miles northeast of Pie Town and 2 miles west of Techado Mesa, in the NW1/4NW1/4 of sec. 24, T. 4 N., R. 10 W.

A1 0 to 2 inches; brown (10YR 5/3) gravelly clay loam, brown (10YR 4/3) moist; weak very fine granular structure; loose, slightly sticky and plastic; few fine and very fine roots; 25 percent pebbles and channery fragments; neutral; abrupt smooth boundary.

C1 2 to 10 inches; light yellowish brown (2.5Y 6/4) clay loam, light olive brown (2.5Y 5/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; common medium roots and few fine and very fine roots; 5 percent pebbles and 5 percent cobbles; neutral; abrupt wavy boundary.

C2ca 10 to 16 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, sticky and very plastic; few coarse, fine, and very fine roots; 5 percent pebbles and 15 percent soft shale plates; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr 16 inches; weathered yellowish brown shale.

Depth to bedrock is 4 to 20 inches. Content of rock fragments ranges from 0 to 35 percent.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5 when dry and 4 or 5 when moist, and chroma of 2 to 4 when dry or moist. It is gravelly clay loam or loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 2 to 4 when dry or moist. It is clay or clay loam and averages 37 to 55 percent clay.

Modyon Series

The soils in the Modyon series are classified as loamy-skeletal, mixed, mesic Aridic Calciustolls. These moderately deep, well drained soils formed in residuum derived mainly from basalt. They are on ridges and side slopes in areas of basalt flows. Slope is 3 to 15 percent. Elevation is 7,200 to 7,600 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Modyon cobbly loam in an area of Rudd-Modyon complex, 3 to 15 percent slopes; about 12 miles south of Old Horse Springs; in the SE1/4SE1/4 of sec. 25, T. 6 S., R. 14 W.

A1 0 to 3 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark gray (10YR 3/1) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine roots and common fine roots; 10 percent cobbles, 15 percent pebbles, and 5 percent stones; violently effervescent; moderately alkaline; clear smooth boundary.

B2 3 to 16 inches; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots and common fine roots; 25 percent cobbles and 15 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

B3ca 16 to 24 inches; grayish brown (10YR 5/2) very cobbly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; 25 percent cobbles and 15 percent pebbles; violently effervescent; moderately alkaline; gradual wavy boundary.

C1ca 24 to 28 inches; white (10YR 8/1) very cobbly loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and nonplastic; common fine and very fine roots; 20 percent cobbles and 25 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

R 28 inches; basalt.

The mollic epipedon is 10 to 16 inches thick. The solum is 10 to 18 inches thick.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4 when dry, and chroma of 1 to 3 when dry or moist. Content of rock fragments ranges from 15 to 30 percent.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 35 to 50 percent. The fine earth fraction is clay loam or loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 8 when dry and 4 to 7 when moist, and chroma of 1 to 4 when dry or moist. Content of rock fragments ranges from 40 to 55 percent. The fine earth fraction is loam or sandy clay loam. Calcium carbonate equivalent ranges from 15 to 55 percent.

Motoqua Series

The soils in the Motoqua series are classified as loamy-skeletal, mixed, mesic Lithic Argiustolls. These shallow, well drained soils formed in residuum derived mainly from tuff and lava. They are on hills and mountains. Slope is 8 to 60 percent. Elevation is 6,800 to 8,200 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Motoqua very gravelly loam in an area of Motoqua-Rock outcrop complex, 8 to 30 percent slopes; about 2 miles southwest of Old Horse Springs; in the NE1/4SW1/4 of sec. 2, T. 5 S., R. 14 W.

A1 0 to 3 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many fine and very fine roots; 30 percent pebbles, 10 percent cobbles, and 5 percent stones; neutral; abrupt smooth boundary.

B2t 3 to 10 inches; dark brown (10YR 4/3) very cobbly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; common thin and moderately thick clay films on faces of peds and rock fragments; 15 percent pebbles, 15 percent cobbles, and 10 percent stones; neutral; abrupt irregular boundary.

R 10 inches; rhyolitic tuff.

The thickness of the solum and depth to bedrock range from 5 to 20 inches.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when dry or moist. It is very gravelly loam, very cobbly loam, or extremely cobbly loam and is 35 to 70 percent rock fragments.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry and 2 to 4 when moist, and chroma of 2 to 4 when dry or moist. Content of rock fragments ranges from 35 to 65 percent. The fine earth fraction is loam or clay loam.

Parquat Series

The soils in the Parquat series are classified as clayey-skeletal, mixed, mesic Aridic Argiustolls. These deep, well drained soils formed in gravelly alluvium derived mainly from volcanic material. They are on hills, alluvial fans, and terraces. Slope is 5 to 15 percent. Elevation is 7,600 to 8,100 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Parquat very cobbly sandy loam in an area of Parquat-Tafoya association, 5 to 30 percent slopes; about 7 miles southwest of Pie Town; in the NW1/4SW1/4 of sec. 8, T. 1 S., R. 13 W.

A1 0 to 2 inches; dark brown (10YR 3/3) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, friable, slightly sticky and slightly plastic; few fine and very fine roots; 20 percent pebbles, 25 percent cobbles, and 10 percent stones; mildly alkaline; abrupt smooth boundary.

B21t 2 to 12 inches; dark brown (10YR 4/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common coarse and very fine roots and few medium and fine roots; few thin clay films on faces of peds and lining pores; 25 percent pebbles, 5 percent cobbles, and 5 percent stones; mildly alkaline; clear wavy boundary.

B22t 12 to 19 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; few coarse, medium, fine, and very fine roots; few moderately thick clay films on faces of peds and lining pores; 10 percent pebbles, 20 percent cobbles, and 20 percent stones; mildly alkaline; gradual wavy boundary.

IIC1ca 19 to 33 inches; very pale brown (10YR 8/3) very cobbly sandy loam, very pale brown (10YR 7/3) moist; massive; loose, friable, nonsticky and nonplastic; few medium and fine roots; 15 percent pebbles, 25 percent cobbles, and 10 percent stones; violently effervescent; mildly alkaline; abrupt smooth boundary.

IIC2ca 33 to 60 inches; light yellowish brown (10YR 6/4) very cobbly loamy coarse sand, yellowish brown (10YR 5/4) moist; massive; loose, friable, nonsticky and nonplastic; few fine and medium roots; 20 percent pebbles, 15 percent cobbles, and 5 percent stones; violently effervescent; mildly alkaline.

The solum is 19 to 29 inches thick. The mollic epipedon is 7 to 14 inches thick. Content of rock fragments averages 35 to 60 percent. Depth to the calcic horizon is 19 to 29 inches.

The A horizon has value of 3 or 4 when dry, and it has chroma of 2 or 3 when dry or moist.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 5 when dry, and chroma of 2 to 4 when dry. It is very cobbly clay loam, very gravelly clay loam, or very cobbly clay and is 35 to 45 percent clay.

The calcic horizon has hue of 7.5YR or 10YR, value of 6 to 8 when dry and 5 to 7 when moist, and chroma of 2 to 4. It is very cobbly sandy loam or cobbly sandy loam. Calcium carbonate equivalent ranges from 15 to 50 percent.

The C horizon has hue of 7.5YR or 10YR, value of 6 to 8 when dry and 5 to 7 when moist, and chroma of 2 to 4. It is very cobbly loamy coarse sand or very cobbly sandy loam.

Penistaja Series

The soils in the Penistaja series are classified as fine-loamy, mixed, mesic Ustollic Haplargids. These deep, well drained soils formed in alluvium. They are on ridges and plains. Slope is 1 to 5 percent. Elevation is 7,000 to 7,500 feet. The average annual precipitation is 9 to 12 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Penistaja sandy loam in an area of Penistaja-Viuda-Rock outcrop association, 0 to 9 percent slopes; about 16 miles north of Pie Town; in the SW1/4NW1/4 of sec. 31, T. 4 N., R. 12 W.

A1 0 to 3 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; neutral; clear smooth boundary.

B2t 3 to 19 inches; brown (7.5YR 5/4) sandy clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common fine and very fine roots; few thin clay films on faces of peds; neutral; abrupt smooth boundary.

B3t 19 to 25 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots and common very fine roots; few thin clay films on faces of peds and as bridges between sand grains; slightly effervescent; moderately alkaline; clear smooth boundary.

C1 25 to 40 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, slightly sticky and nonplastic; few fine and very fine roots; slightly effervescent; moderately alkaline; gradual smooth boundary.

C2 40 to 60 inches; light brown (7.5YR 6/4) sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable, slightly sticky and nonplastic; few fine and very fine roots; slightly effervescent; moderately alkaline.

The solum is 18 to 38 inches thick. Some pedons have hard basalt lava or soft sandstone or shale at a depth of 40 to 60 inches.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 4 to 6 when dry or moist.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 4 to 6 when dry or moist. Some pedons have strata of loamy sand in the lower part of the C horizon.

Pietown Series

The soils in the Pietown series are classified as coarse-loamy, mixed (calcareous), mesic Typic Ustifluvents. These deep, well drained soils formed in alluvium derived mainly from soft sandstone. They are on flood plains of intermittent streams, on alluvial fans, and in swales and drainageways. Slope is 0 to 5 percent. Elevation is 6,000 to 7,600 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Pietown fine sandy loam in an area of Pietown-Hickman complex, 0 to 5 percent slopes; about 6 miles northwest of Quemado; in the NE1/4NW1/4 of sec. 14, T. 2 N., R. 17 W.

A1 0 to 10 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; weak thick platy structure parting to weak medium granular; soft, very friable, slightly sticky and nonplastic; many fine roots; slightly effervescent; mildly alkaline; clear smooth boundary.

C1 10 to 28 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; slightly effervescent; mildly alkaline; abrupt smooth boundary.

C2 28 to 32 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and very fine roots; slightly effervescent; moderately alkaline; abrupt smooth boundary.

C3 32 to 42 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few fine and very fine roots; slightly effervescent; mildly alkaline; clear smooth boundary.

C4 42 to 60 inches; pale brown (10YR 6/3) loamy fine sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; slightly effervescent; moderately alkaline.

The 10- to 40-inch control section averages 5 to 17 percent clay.

The A horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 to 5 when moist, and chroma of 3 or 4 when dry or moist. It is stratified silt loam, fine sandy loam, and loamy fine sand.

Pleioville Series

The soils in the Pleioville series are classified as clayey-skeletal, montmorillonitic Mollic Eutroboralfs. These moderately deep, well drained soils formed in residuum derived mainly from conglomerate and tuff. They are on plains. Slope is 3 to 15 percent. Elevation is 7,400 to 8,000 feet. The average annual precipitation is 16 to 20 inches. The average annual air temperature is 40 to 46 degrees F, and the frost-free period is 80 to 120 days.

Typical pedon of Pleioville gravelly sandy loam, 3 to 15 percent slopes; about 12 miles south and 4 miles east of Luera Peak, east of Corduroy Canyon; in the NW1/4SE1/4 of sec. 36, T. 7 S., R. 10 W.

A1 0 to 2 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, friable, nonsticky and nonplastic; common fine roots and many very fine roots; 25 percent pebbles; neutral; abrupt smooth boundary.

B21t 2 to 6 inches; brown (7.5YR 4/4) gravelly clay loam, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; few medium roots, common fine roots, and many very fine roots; few thin clay films on faces of peds and in pores; 25 percent pebbles; neutral; clear smooth boundary.

B22t 6 to 12 inches; reddish brown (5YR 4/4) gravelly clay, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; common thin clay films on faces of peds and in pores; 30 percent pebbles; neutral; clear wavy boundary.

B23t 12 to 16 inches; yellowish red (5YR 5/6) very gravelly clay, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few fine roots and common very fine roots; common moderately thick clay films on faces of peds and in pores; 50 percent pebbles; neutral; clear wavy boundary.

B3t 16 to 24 inches; light reddish brown (5YR 6/4) very gravelly clay loam, yellowish red (5YR 5/6) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; few fine and very fine roots; few thin clay films on faces of peds and pebbles; 55 percent pebbles; mildly alkaline; clear wavy boundary.

R 24 inches; volcanic conglomerate composed mainly of andesite, basalt, and tuff.

The solum is 16 to 25 inches thick. Depth to bedrock is 20 to 40 inches.

The A horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist. It is 15 to 25 percent pebbles.

The B horizon has hue of 5YR or 7.5YR, value of 4 or 5 when dry and 4 to 6 when moist, and chroma of 4 to 6 when dry or moist. Content of rock fragments ranges from 15 to 50 percent, but it averages 35 to 50 percent. The fine earth fraction is heavy clay loam or clay and is 35 to 55 percent clay.

The C horizon, where present, has hue of 5YR or 7.5YR, value of 5 to 7 when dry and 4 or 5 when moist, and chroma of 4 to 6 when dry or moist. Content of rock fragments ranges from 40 to 65 percent. The fine earth fraction is sandy clay loam, clay loam, or sandy loam.

Ralphston Series

The soils in the Ralphston series are classified as fine-loamy, mixed, mesic Torriorthentic Haplustolls. These deep, well drained soils formed in residuum and alluvium derived mainly from volcanic ash. They are on side slopes of hills and ridges. Slope is 1 to 9 percent. Elevation is 7,000 to 7,800 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Ralphston loam in an area of Ralphston-Amenson loams, 1 to 9 percent slopes; about 6 miles west of Quemado; in the NW1/4SW1/4SW1/4 of sec. 3, T. 1 N., R. 17 W.

A1 0 to 2 inches; dark brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; loose, soft, nonsticky and slightly plastic; common fine and very fine roots and few medium roots; slightly effervescent; moderately alkaline; clear smooth boundary.

B2 2 to 7 inches; dark brown (10YR 3/3) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; loose, soft, nonsticky and slightly plastic; common medium roots and few very fine and coarse roots; strongly effervescent; moderately alkaline; clear smooth boundary.

B3 7 to 13 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few very fine, fine, and coarse roots; strongly effervescent; moderately alkaline; abrupt wavy boundary.

C1 13 to 20 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine, fine, and coarse roots; strongly effervescent; moderately alkaline; abrupt wavy boundary.

C2 20 to 25 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few very fine, fine, and coarse roots; strongly effervescent; strongly alkaline; clear wavy boundary.

IIC3 25 to 60 inches; white (10YR 8/2) loam, very pale brown (10YR 7/4) moist; massive; hard, firm, nonsticky and slightly plastic; violently effervescent; strongly alkaline.

The mollic epipedon is 10 to 16 inches thick. The solum is 11 to 29 inches thick. Depth to stratified ash sediment is 20 to 30 inches. Content of rock fragments ranges from 0 to 15 percent.

The A horizon has value of 3 or 4 when dry or moist, and it has chroma of 2 or 3 when dry or moist.

The B horizon has value of 3 to 5 when dry and 2 to 5 when moist, and it has chroma of 2 to 4 when dry or moist.

The C horizon has value of 6 to 8 when dry and 4 to 7 when moist, and it has chroma of 2 to 4 when dry or moist. It is loam or clay loam.

Royosa Series

The soils in the Royosa series are classified as mixed, mesic Typic Ustipsamments. These deep, somewhat excessively drained soils formed in eolian material. They are on hills and ridges. Slope is 3 to 15 percent. Elevation is 7,000 to 7,900 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of Royosa fine sand, 3 to 15 percent slopes; about 19 miles northeast of Pie Town; in the NW1/4NE1/4 of sec. 36, T. 4 N., R. 11 W.

A1 0 to 4 inches; brown (10YR 5/3) fine sand, dark brown (10YR 4/3) moist; single grain; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; neutral; clear smooth boundary.

C1 4 to 38 inches; dark yellowish brown (10YR 4/4) loamy sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; neutral; clear smooth boundary.

C2 38 to 60 inches; yellowish brown (10YR 5/4) sand, dark yellowish brown (10YR 4/4) moist; single grain; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; mildly alkaline.

The A horizon has value of 3 or 4 when moist, and it has chroma of 3 to 6 when dry or moist.

The C horizon has hue of 7.5YR or 10YR, value of 3 to 5 when moist, and chroma of 3 to 6 when dry or moist. It is loamy sand, fine sand, or sand. Some pedons have lenses of gravelly material in the lower part of the C horizon.

Rudd Series

The soils in the Rudd series are classified as loamy-skeletal, mixed, mesic Lithic Calciustolls. These shallow, well drained soils formed in residuum derived mainly from basalt. They are on ridges and mesas. Slope is 3 to 15 percent. Elevation is 7,200 to 7,600 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Rudd gravelly loam in an area of Rudd-Modyon complex, 3 to 15 percent slopes; about 10 miles southwest of Red Hill; in the NE1/4SW1/4 of sec. 14, T. 2 S., R. 21 W.

A1 0 to 2 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; single grain; loose, friable, slightly sticky and plastic; common very fine and fine roots; 30 percent pebbles and 5 percent cobbles; strongly effervescent; mildly alkaline; abrupt smooth boundary.

B21ca 2 to 8 inches; very dark grayish brown (10YR 3/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure and weak medium subangular blocky; hard, friable, sticky and plastic; few fine roots and many very fine roots; 15 percent pebbles and 15 percent cobbles; strongly effervescent; mildly alkaline; clear smooth boundary.

B22ca 8 to 15 inches; light brownish gray (10YR 6/2) very cobbly clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few fine roots and many very fine roots; 20 percent pebbles and 20 percent cobbles; strongly effervescent; mildly alkaline; clear smooth boundary.

C1ca 15 to 20 inches; grayish brown (10YR 5/2) extremely stony loam, dark grayish brown (10YR 4/2) moist; massive; soft, friable, sticky and plastic; common very fine and fine roots; 10 percent pebbles and 80 percent stones; strongly effervescent; moderately alkaline; abrupt irregular boundary.

R 20 inches; basalt.

The solum is 7 to 10 inches thick. Depth to bedrock is 12 to 20 inches.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 15 to 35 percent.

The B horizon has value of 3 or 4 when dry and 2 or 3 when moist, and it has chroma of 1 to 3 when dry or moist. Content of rock fragments ranges from 40 to 60 percent. The fine earth fraction is loam or clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 to 5 when moist, and chroma of 2 to 6 when dry or moist. Content of rock fragments ranges from 60 to 90 percent. The fine earth fraction is loam or clay loam.

Smilo Series

The soils in the Smilo series are classified as fine, mixed Pachic Argiborolls. These moderately deep, well drained soils formed in residuum derived mainly from basalt. They are on alluvial fans in areas of basalt flows. Slope is 0 to 15 percent. Elevation is 7,400 to 8,400 feet. The average annual precipitation is 16 to 20 inches. The average annual air temperature is 40 to 46 degrees F, and the frost-free period is 80 to 120 days.

Typical pedon of a Smilo cobbly sandy loam in an area of Smilo-Adman complex, moist, 3 to 15 percent slopes; about 21 miles south of Old Horse Springs and 5 miles southwest of Pelona Mountain; in the SE1/4SW1/4 of sec. 10, T. 8 S., R. 13 W.

A1 0 to 2 inches; dark yellowish brown (10YR 4/4) cobbly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; 10 percent pebbles and 15 percent cobbles; medium acid; clear smooth boundary.

B21t 2 to 8 inches; dark yellowish brown (10YR 4/4) loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few thin clay films on faces of peds; neutral; clear smooth boundary.

B22t 8 to 15 inches; dark yellowish brown (10YR 3/4) cobbly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; very hard, firm, sticky and plastic; few fine roots and common very fine roots; common moderately thick clay films on faces of peds; 10 percent pebbles, 15 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

B23t 15 to 25 inches; dark brown (7.5YR 4/4) cobbly clay, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few fine roots and common very fine roots; common moderately thick clay films on faces of peds; 10 percent pebbles, 20 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

C1 25 to 32 inches; dark brown (7.5YR 4/4) gravelly clay, dark brown (7.5YR 4/2) moist; massive; very hard, firm, sticky and plastic; few very fine roots; 15 percent pebbles; neutral; abrupt irregular boundary.

R 32 inches; basalt.

The solum is 16 to 29 inches thick. Depth to bedrock is 20 to 40 inches.

The A horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 1 to 4 when dry or moist. Content of rock fragments ranges from 15 to 35 percent. The fine earth fraction is sandy loam or loam.

The B horizon has hue of 5YR, 7.5YR, or 10YR, value of 3 to 5 when dry and 3 to 7 when moist, and chroma of 1 to 6 when dry or moist. Content of rock fragments ranges from 5 to 30 percent. It is loam, clay, or clay loam and averages more than 35 percent clay.

The C horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 to 8 when dry and 3 to 7 when moist, and chroma of 3 to 6 when dry or moist. Content of rock fragments ranges from 15 to 35 percent. The fine earth fraction is clay loam or clay.

Tafoya Series

The soils in the Tafoya series are classified as clayey-skeletal, mixed, mesic Aridic Argiustolls. These deep, well drained soils formed in mixed alluvium on alluvial terraces, hills, and alluvial fans. Slope is 15 to 30 percent. Elevation is 7,600 to 8,100 feet. The average annual precipitation is about 14 to 15 inches. The average annual air temperature is 47 to 51 degrees F, and the frost-free period is 120 to 160 days.

Typical pedon of a Tafoya stony loam in an area of Parquat-Tafoya association, 5 to 30 percent slopes; about 16 miles south of Pie Town, in the SE1/4SE1/4 of sec. 11, T. 2 S, R. 14 W.

A1 0 to 3 inches; dark brown (10YR 4/3) stony loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable, nonsticky and slightly plastic; few fine and very fine roots; 5 percent pebbles and 10 percent stones; mildly alkaline; abrupt smooth boundary.

B21t 3 to 9 inches; dark brown (7.5YR 4/3) very cobbly clay loam, dark brown (7.5YR 3/2) moist; strong fine prismatic structure parting to moderate fine subangular blocky; hard, firm, sticky and plastic; common fine and very fine roots and few medium roots; common moderately thick clay films on faces of peds; 20 percent pebbles and 15 percent cobbles; mildly alkaline; clear smooth boundary.

B22t 9 to 15 inches; dark brown (7.5YR 4/4) very gravelly clay loam, dark brown (7.5YR 3/4) moist; strong fine prismatic structure parting to moderate fine subangular blocky; hard, very firm, sticky and plastic; common fine and very fine roots and few medium roots; common moderately thick clay films on faces of peds; 40 percent pebbles and 5 percent cobbles; mildly alkaline; gradual smooth boundary.

B3 15 to 25 inches; brown (7.5YR 5/4) very gravelly clay loam, dark brown (7.5YR 4/4) moist; weak fine and medium subangular blocky structure; hard, firm, very sticky and plastic; few fine and medium roots; 30 percent pebbles and 15 percent cobbles; mildly alkaline; gradual wavy boundary.

C 25 to 60 inches; light brown (7.5YR 6/4) very gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; massive; loose, slightly sticky and slightly plastic; few fine roots; 40 percent pebbles, 10 percent cobbles, and 10 percent stones; mildly alkaline.

The solum is 20 to 30 inches thick. Rock fragment content of the B horizon ranges from 35 to 60 percent.

Tejana Series

The soils in the Tejana series are classified as fine-loamy, mixed, mesic Aridic Haplustolls. These deep, well drained soils formed in ash and cinders over residuum derived from sandstone. They are on plains and mesas. Slope is 3 to 15 percent. Elevation is 6,500 to 7,000 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Tejana very gravelly loam in an area of Tejana-Rock outcrop complex, 3 to 15 percent slopes; about 8 miles northeast of Lake Armijo; in the NE1/4 of sec. 17, T. 3 N., R. 17 W.

A1 0 to 4 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine platy structure and weak fine granular; soft, friable, slightly sticky and slightly plastic; many fine roots and common very fine roots; 40 percent pebble-sized cinders; mildly alkaline; clear smooth boundary.

B21 4 to 12 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; 25 percent pebble-sized cinders; mildly alkaline; clear wavy boundary.

B22 12 to 24 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots and few fine roots; 30 percent pebble-sized cinders; moderately alkaline; abrupt irregular boundary.

IIB3 24 to 36 inches; light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few fine roots; slightly effervescent; strongly alkaline; clear smooth boundary.

IIC1 36 to 48 inches; brownish yellow (10YR 6/6) sandy clay loam, yellowish brown (10YR 5/6) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; slightly effervescent; strongly alkaline; clear smooth boundary.

IIC2 48 to 60 inches; brownish yellow (10YR 6/6) sandy clay loam, yellowish brown (10YR 5/6) moist; massive; slightly hard, firm, sticky and slightly plastic; slightly effervescent; moderately alkaline.

The thickness of the solum and depth to a lithologic discontinuity range from 20 to 40 inches.

The A horizon has value of 3 to 5 when dry or moist, and it has chroma of 3 or 4 when dry or moist. Content of rock fragments ranges from 35 to 50 percent.

The B horizon has value of 3 to 5 when dry or moist, and it has chroma of 3 or 4 when dry or moist. It is loam or sandy clay loam and is 10 to 35 percent rock fragments.

The C horizon has value of 3 to 7 when dry and 3 to 6 when moist, and it has chroma of 3 to 7 when dry or moist.

Telescope Series

The soils in the Telescope series are classified as coarse-loamy, mixed, mesic Aridic Ustochrepts. These deep, well drained soils formed in coarse textured alluvium modified by wind. They are on hummocks on alluvial fans. Slope is 0 to 10 percent. Elevation is 6,700 to 7,400 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 120 to 160 days.

Typical pedon of Telescope loamy sand, 0 to 3 percent slopes; about 18 miles southwest of Datil; in the SE1/4NW1/4 of sec. 29, T. 4 S., R. 11 W.

A1 0 to 3 inches; brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) moist; weak fine platy structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; neutral; clear smooth boundary.

B21 3 to 16 inches; brown (10YR 5/3) sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; neutral; clear smooth boundary.

B22 16 to 23 inches; brown (10YR 5/3) sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few fine roots and common very fine roots; neutral; clear smooth boundary.

C1 23 to 30 inches; brown (7.5YR 5/4) loamy sand, dark brown (7.5YR 3/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; mildly alkaline; clear wavy boundary.

C2ca 30 to 60 inches; light brown (7.5YR 6/4) loamy sand, brown (7.5YR 5/4) moist; massive; loose, nonsticky and nonplastic; slightly effervescent; moderately alkaline.

The solum is 15 to 38 inches thick. Content of rock fragments ranges from 0 to 25 percent.

The A horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 2 to 4 when dry or moist. It is loamy sand or loamy fine sand.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 2 to 4 when dry or moist.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 to 6 when moist, and chroma of 1 to 4 when dry or moist. It is loamy sand, fine sandy loam, or sandy loam. Content of rock fragments ranges from 5 to 25 percent.

Thunderbird Series

The soils in the Thunderbird series are classified as fine, montmorillonitic, mesic Aridic Argiustolls. These moderately deep, well drained soils formed in residuum derived mainly from basalt. They are on mesas, hills, and ridges. Slope is 3 to 15 percent. Elevation is 7,000 to 8,000 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 160 days.

Typical pedon of a Thunderbird loam in an area of Cabezon-Thunderbird-Celsosprings complex, 3 to 25 percent slopes; about 6.5 miles south of U.S. Highway 60 and 0.8 mile east of powerline; in the NW1/4SW1/4 of sec. 22, T. 2 S., R. 20 W.

A1 0 to 5 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; weak fine and medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; neutral; clear smooth boundary.

B2t 5 to 14 inches; reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/3) moist; moderate fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; few fine roots and common very fine roots; few thin clay films on faces of peds; neutral; abrupt smooth boundary.

C1ca 14 to 23 inches; reddish brown (5YR 5/3) clay loam, dark reddish brown (5YR 3/3) moist; massive; hard, firm, sticky and plastic; few very fine roots; slightly effervescent; mildly alkaline; abrupt wavy boundary.

R 23 inches; basalt.

The solum is 12 to 26 inches thick. Depth to bedrock is 20 to 40 inches. Content of rock fragments ranges from 0 to 5 percent.

The A horizon has hue of 7.5YR or 10YR, value of 5 when dry and 2 or 3 when moist, and chroma of 2 to 4 when dry or moist.

The B horizon has hue of 5YR, 7.5YR, or 10YR, value of 3 to 5 when dry, and chroma of 2 to 4 when dry or moist.

The C horizon has hue of 5YR, 7.5YR, or 10YR, value of 5 to 7 when dry and 3 to 8 when moist, and chroma of 2 to 4 when dry or moist.

Tolman Series

The soils in the Tolman series are classified as loamy-skeletal, mixed Lithic Argiborolls. These shallow, well drained soils formed in residuum derived mainly from volcanic rock. They are on hills and mountains. Slope is 10 to 60 percent. Elevation is 7,600 to 10,250 feet. The average annual precipitation is 16 to 20 inches. The average annual air temperature is 40 to 46 degrees F, and the frost-free period is 80 to 120 days.

Typical pedon of a Tolman extremely cobbly loam in an area of Tolman-Rock outcrop complex, 25 to 60 percent slopes; about 16 miles southeast of Old Horse Springs and 5 miles northeast of Pelona Mountain; in the NW1/4NW1/4 of sec. 2, T. 7 S., R. 12 W.

A1 0 to 2 inches; grayish brown (10YR 5/2) extremely cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine platy structure and weak fine granular; soft, very friable, slightly sticky and slightly plastic; common fine and very fine roots; 35 percent pebbles, 30 percent cobbles, and 5 percent stones; neutral; abrupt smooth boundary.

B21t 2 to 5 inches; brown (10YR 5/3) very cobbly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and very fine roots; common thin clay films on faces of peds; 20 percent pebbles, 20 percent cobbles, and 20 percent stones; neutral; clear smooth boundary.

B22t 5 to 9 inches; brown (10YR 5/3) extremely cobbly clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots and few medium and coarse roots; few thin clay films on faces of peds; 20 percent pebbles, 25 percent cobbles, and 20 percent stones; neutral; abrupt wavy boundary.

R 9 inches; hard tuff.

The thickness of the solum and depth to bedrock range from 7 to 20 inches.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 15 to 70 percent.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 7 when dry and 3 or 4 when moist, and chroma of 2 to 4 when dry or moist. Content of rock fragments ranges from 35 to 70 percent. The fine earth fraction is loam, sandy clay loam, or clay loam and is 20 to 35 percent clay.

The R horizon is tuff, lava, or volcanic sandstone and conglomerate.

Travessilla Series

The soils in the Travessilla series are classified as loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents. These shallow, well drained soils formed in residuum and alluvium derived mainly from sandstone. They are on ridges, benches, and hills. Slope is 2 to 30 percent. Elevation is 6,500 to 7,800 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Travessilla very gravelly sandy loam in an area of Mion-Travessilla-Rock outcrop complex, 2 to 30 percent slopes; about 0.5 mile north of the Rio Salado and 0.5 mile west of the Catron-Socorro County lines; in the NW1/4NW1/4 of sec. 1, T. 3 N., R. 9 W.

A1 0 to 3 inches; light yellowish brown (2.5Y 6/4) very gravelly sandy loam, olive brown (2.5Y 4/4) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine roots and many fine roots; 35 percent pebbles and 10 percent cobbles; slightly effervescent; mildly alkaline; abrupt smooth boundary.
C1ca 3 to 8 inches; light olive brown (2.5Y 5/4) cobbly sandy loam, olive brown (2.5Y 4/4) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine roots and many fine roots; 10 percent pebbles and 15 percent cobbles; strongly effervescent; mildly alkaline; clear wavy boundary.
C2ca 8 to 13 inches; pale brown (10YR 6/3) cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, slightly sticky and nonplastic; few very fine and medium roots and common fine roots; 10 percent pebbles and 25 percent cobbles; strongly effervescent; mildly alkaline; abrupt smooth boundary.
R 13 inches; sandstone.

Depth to bedrock is 6 to 20 inches.

The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 3 to 5 when moist, and chroma of 3 or 4 when dry or moist. Content of rock fragments ranges from 35 to 60 percent.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 4 or 5 when moist, and 3 or 4 when dry or moist. Content of rock fragments ranges from 15 to 35 percent.

Typic Argiborolls

Typic Argiborolls are extremely variable. These moderately deep and deep, well drained soils formed in colluvium derived from tuff, basalt, and sandstone. They are on side slopes near the bottom of mountain canyons. Slope is 5 to 45 percent. Elevation is 7,600 to 8,200 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 41 to 46 degrees F, and the frost-free period is 80 to 115 days.

Example pedon of Typic Argiborolls in an area of Typic Argiborolls-Tolman-Motoqua association, 5 to 60 percent slopes; about 10 miles north of Old Horse Springs; in the NE1/4SW1/4 of sec. 7, T. 3 S., R. 13 W.

A1 0 to 3 inches; grayish brown (10YR 5/2) extremely cobbly sandy loam, very dark brown (10YR 2/2) moist; moderate thin platy structure parting to moderate fine granular; loose, very friable, nonsticky and nonplastic; few fine and very fine roots; 5 percent stones, 35 percent cobbles, and 30 percent pebbles; neutral; clear smooth boundary.
B1 3 to 8 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; few fine roots and common very fine roots; 15 percent cobbles and 15 percent pebbles; neutral; clear wavy boundary.
B21t 8 to 13 inches; dark brown (10YR 4/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots and common very fine roots; common thin clay films on faces of peds and in pores; 5 percent cobbles and 15 percent pebbles; neutral; clear wavy boundary.
B22t 13 to 21 inches; brown (7.5YR 4/4) gravelly clay, brown (7.5YR 4/4) moist; moderate coarse subangular blocky structure; very hard, very firm, sticky and plastic; few medium and very fine roots; common thin clay films on faces of peds; 20 percent pebbles; neutral; clear wavy boundary.
B23 21 to 27 inches; brown (7.5YR 5/4) gravelly clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure, hard, firm, sticky and plastic; few fine and very fine roots; 20 percent pebbles; neutral; gradual wavy boundary.
B3 27 to 30 inches; light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and very fine roots; 20 percent pebbles; neutral; clear wavy boundary.
C1 30 to 36 inches; reddish yellow (7.5YR 6/6) gravelly loam, strong brown (7.5YR 4/6) moist; massive; soft, friable, slightly sticky and slightly plastic; few fine and very fine roots; 20 percent pebbles; neutral; abrupt wavy boundary.
R 36 inches; tuff.

Depth to bedrock is 25 to 60 inches or more. The mollic epipedon is 9 to 16 inches thick.

The A horizon has value of 3 to 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. Content of rock fragments ranges from 10 to 70 percent.

The B horizon has hue of 10YR or 7.5YR, value of 4 to 6 when dry and 2 to 5 when moist, and chroma of 2 to 6 when dry or moist. Content of rock fragments ranges from 5 to 35 percent. The fine earth fraction is loam, clay loam, clay, or sandy clay loam. The control section averages 35 to 50 percent clay.

The C horizon has hue of 10YR or 7.5YR, value of 5 to 8 when dry and 4 to 6 when moist, and chroma of 3 to 6 when dry or moist. Content of rock fragments ranges from 5 to 35 percent. The fine earth fraction is loam, sandy clay loam, or clay loam.

Typic Ustorthents

Typic Ustorthents are extremely variable. They are shallow to deep, well drained soils that formed in alluvium and colluvium derived from sedimentary and volcanic material. They are on alluvial fans, plains, and hills. Slope is 1 to 25 percent. Elevation is 6,700 to 8,100 feet. The average annual precipitation is 12 to 15 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Example pedon of Typic Ustorthents in an area of Typic Ustorthents-Hickman-Majada association, 1 to 25 percent slopes; in sec. 28, T. 1 N., R. 15 W.

A1 0 to 2 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; mildly alkaline; clear smooth boundary.

C1 2 to 8 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine roots; moderately alkaline; clear wavy boundary.

C2 8 to 17 inches; light gray (10YR 7/2) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine roots; moderately alkaline; clear wavy boundary.

C3 17 to 34 inches; light gray (10YR 7/1) fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; loose, very friable, nonsticky and nonplastic; moderately alkaline; clear smooth boundary.

C4 34 to 60 inches; light gray (10YR 7/1) weakly cemented volcanic debris.

The profile is 4 to 60 inches thick or more. Hue is 2.5Y, 10YR, or 7.5YR throughout. The profile is sandy loam to loam.

The A horizon is 0 to 35 percent cobbles and pebbles.

Ustic Torriorthents

Ustic Torriorthents are extremely variable in their characteristics. These shallow to deep, well drained soils formed in alluvium and colluvium derived from sedimentary and volcanic material. They are on mesas, canyonsides, and volcanic dikes. Slope is 20 to 100 percent. Elevation is 6,000 to 8,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Example pedon of Ustic Torriorthents in an area of Ustic Torriorthents-Rock outcrop-Badland complex, 20 to 100 percent slopes; north of Tejana Mesa; in the NW1/4 of sec. 32, T. 3 N., R. 16 W.

A1 0 to 4 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; weak fine granular structure; loose, nonsticky and nonplastic; common fine and very fine roots; mildly alkaline; clear smooth boundary.

C1ca 4 to 12 inches; brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; massive; loose, nonsticky and nonplastic; few very fine roots; strongly alkaline; abrupt wavy boundary.

Cr 12 inches; light olive brown (2.5Y 5/4), soft, calcareous sandstone.

The profile is 4 to 60 inches thick or more. Hue is 2.5R, 10YR, 7.5YR, or 5YR throughout. The profile is loamy sand to clay. Calcium carbonate equivalent ranges from 0 to 30 percent.

Valnor Series

The soils in the Valnor series are classified as fine, mixed Mollic Eutroboralfs. These moderately deep, well drained soils formed in residuum and local alluvium derived mainly from interbedded shale and sandstone. They are on high plateaus and mesas. Slope is 1 to 7 percent. Elevation is 7,600 to 8,200 feet. The average annual precipitation is 15 to 18 inches. The average annual air temperature is 40 to 45 degrees F, and the frost-free period is 80 to 115 days.

Typical pedon of a Valnor fine sandy loam in an area of Valnor-Midnight association, 1 to 25 percent slopes; about 18 miles northeast of Pie Town; in the SE1/4NE1/4 of sec. 28, T. 4 N., R. 10 W.

A1 0 to 6 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; few fine roots and common very fine roots; neutral; gradual smooth boundary.

B1 6 to 12 inches; yellowish brown (10YR 5/4) sandy clay loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few medium and very fine roots; neutral; clear wavy boundary.

B21t 12 to 21 inches; brown (10YR 4/3) heavy clay loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure; hard, firm, sticky and plastic; few fine and very fine roots; few thin clay films on faces of peds and in pores; neutral; clear wavy boundary.

B22t 21 to 27 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate coarse angular blocky; very hard, very firm, sticky and very plastic; few fine and very fine roots; common thin clay films on faces of peds and in pores; mildly alkaline; clear wavy boundary.

B23t 27 to 31 inches; yellowish brown (10YR 5/6) clay, yellowish brown (10YR 5/4) moist; moderate medium prismatic structure parting to moderate coarse angular blocky; very hard, very firm, sticky and very plastic; few fine and very fine roots; common thin clay films on faces of peds and in pores; disseminated lime; slightly effervescent; mildly alkaline; clear wavy boundary.

C1 31 to 36 inches; yellowish brown (10YR 5/6) heavy clay loam, yellowish brown (10YR 5/4) moist; massive; hard, firm, sticky and plastic; few fine and very fine roots; disseminated lime; slightly effervescent; mildly alkaline; clear wavy boundary.

Cr 36 inches; gray (10YR 5/1), soft, carbonaceous shale.

The solum is 17 to 31 inches thick. Depth to bedrock ranges from 20 to 40 inches. Content of rock fragments ranges from 0 to 15 percent.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 to 4 when dry or moist.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry or moist, and chroma of 2 to 6 when dry or moist. It is sandy clay loam, clay loam, sandy clay, or clay.

The C horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 4 to 6 when dry or moist. It is clay loam, clay, or silty clay.

Veteado Series

The soils in the Veteado series are classified as fine, mixed, mesic Ustollic Paleargids. These deep, well drained soils formed in alluvium. They are on alluvial fans. Slope is 1 to 4 percent. Elevation is 7,000 to 7,500 feet. The average annual precipitation is 9 to 12 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Veteado sandy loam in an area of Veteado-Penistaja sandy loams, 1 to 5 percent slopes; about 15 miles northwest of Pie Town and 0.25 mile south of Trail Lake; in the SW1/4SE1/4 of sec. 4, T. 3 N., R. 13 W.

A1 0 to 3 inches; brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; weak thin platy structure and weak fine granular; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; neutral; abrupt smooth boundary.

A2 3 to 6 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; moderate fine platy structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; few fine roots and common very fine roots; neutral; abrupt smooth boundary.

B2t 6 to 16 inches; brown (7.5YR 4/4) clay, brown (7.5YR 4/4) moist; moderate medium prismatic structure parting to strong medium angular blocky; very hard, very firm, sticky and plastic; few fine roots and many very fine roots; common thin clay films on faces of peds and in pores; neutral; clear wavy boundary.

B2ca 16 to 28 inches; light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 5/4) moist; moderate coarse subangular blocky structure; hard, firm, sticky and plastic; few fine roots and common very fine roots; few thin clay films on faces of peds and in pores; lime segregated in common irregularly shaped medium sized filaments and seams; slightly effervescent; mildly alkaline; clear wavy boundary.

C1ca 28 to 35 inches; light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, slightly sticky and plastic; few fine and very fine roots; disseminated lime; slightly effervescent; moderately alkaline; gradual wavy boundary.

C2ca 35 to 60 inches; light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 5/4) moist; weak coarse subangular blocky structure; hard, friable, sticky and plastic; few fine and very fine roots; disseminated lime; slightly effervescent; strongly alkaline.

The solum is 24 to 39 inches thick. Content of rock fragments ranges from 0 to 10 percent.

The A horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 2 to 4 when dry or moist.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 to 5 when moist, and chroma of 3 to 6 when dry or moist. It averages more than 35 percent clay.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 4 to 6 when moist, and chroma of 4 to 6 when dry or moist.

Viuda Series

The soils in the Viuda series are classified as clayey, mixed, mesic Lithic Ustollic Haplargids. These shallow, well drained soils formed in residuum derived mainly from basalt. They are on old basalt flows. Slope is 0 to 3 percent. Elevation is 7,100 to 7,400 feet. The average annual precipitation is 9 to 12 inches. The average annual air temperature is 47 to 54 degrees F, and the frost-free period is 115 to 130 days.

Typical pedon of a Viuda gravelly sandy loam in an area of Penistaja-Viuda-Rock outcrop association, 0 to 9 percent slopes; about 19 miles north of Pie Town; in the NE1/4SE1/4 of sec. 13, T. 4 N., T. 13 W.

A1 0 to 2 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; few fine roots and common very fine roots; 20 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary.

B2t 2 to 8 inches; brown (7.5YR 5/4) gravelly clay, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots and common very fine roots; few thin clay films on faces of peds and in pores; 15 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary.

Cca 8 to 15 inches; light yellowish brown (10YR 6/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, sticky and plastic; common very fine roots; 15 percent pebbles and 5 percent cobbles; disseminated lime; 13 percent calcium carbonate equivalent; violently effervescent; strongly alkaline; clear wavy boundary.

R 15 inches; hard basalt lava with a 0.75-inch layer of lime-cemented soil material on top of the lithic contact.

The solum is 6 to 13 inches thick. Depth to bedrock is 10 to 20 inches.

The A horizon has chroma of 3 or 4 when dry or moist. Content of rock fragments ranges from 15 to 35 percent.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 4 to 6 when dry or moist. Content of rock fragments ranges from 15 to 30 percent. The fine earth fraction is sandy clay or heavy clay loam.

The C horizon has hue of 7.5YR or 10YR, and it has value of 5 or 6 when dry and 4 or 5 when moist. Content of rock fragments ranges from 15 to 30 percent. The fine earth fraction is clay loam or heavy sandy clay loam. Calcium carbonate equivalent ranges from 3 to 14 percent.

Formation of the Soils

This section discusses the conditions of soil formation, relates them to the formation of soils in the survey area, and explains the processes of soil formation.

Soil is a collection of natural bodies occupying the earth's surface. Soil is capable of supporting plants and has properties that are the result of the integrated effects of climate and living matter acting on parent material conditioned by topography over a period of time. The characteristics of the soil at a given location are determined by the physical and chemical properties and mineralogical composition of its parent material, the climatic conditions under which the soil material has accumulated or has been deposited, the plant and animal life on and in the soil, the topography, and the length of time. These factors are extremely complex. The effect of any one factor is hard to isolate and identify, but all interactions are important in determining the nature of the soil. It is convenient, however, to discuss these factors separately and to indicate some of their probable effects on soil formation. These factors are discussed in the following pages.

Parent Material

The soils in this survey area formed in materials derived from many sources ranging from igneous and sedimentary rock to alluvial and eolian sediment (*3, 4, 6*). Because the physical and chemical composition of these materials is highly variable, the nature of the parent material had a strong effect on the kind of soil that developed and, more importantly, on the rate at which development took place. The nature of these parent materials affected or determined the texture, structure, consistency, color, erodibility, and natural fertility of the soils that formed in them.

The main parent materials of the soils in this survey area are residuum, alluvium, and eolian material. These materials are briefly described in the following paragraphs.

Residuum is material produced by the physical and chemical weathering and breakdown of parent rock. This material has not moved. The Hiarc soils, which formed in residuum derived from sandstone, have different properties than do the Modyon soils, which formed in residuum derived from basalt. These differences are a result of the different physical and chemical composition of the parent rock. Other soils that formed in residuum are the Ceniza and Gatlin soils, which formed in residuum derived from volcanic cinders.

Alluvium is sediment that has been moved by water. It includes sand, gravel, clay, and silt. The kinds of alluvium and their location depend largely upon the carrying capacity of the streams that deposited them. The Brycan and Manzano soils formed in geologically recent alluvium. These soils have undergone change since the parent sediment was deposited, so they have developed a weakly expressed B horizon. The Veteado soils formed in the same kind of material, but they are very old and have a strongly expressed Bt horizon and a layer of calcium carbonate accumulation. The Gustspring soils formed in gravelly alluvium deposited by ancient fast-flowing rivers.

Eolian material is wind-deposited sand or silt. This material may have been the upper part of another soil, but it became parent material upon erosion and redeposition. The Royosa soils are the most common and most extensive soils that have formed in this material in this survey area. These soils formed in eolian material deposited on hills and ridges.

Climate

Climate has a significant influence on the kinds of soil that form and the manner in which they form in different geographic areas. In this survey area, temperature, precipitation, and the wind play important roles in forming soils (*7*). If all other factors are equal, variations in climate determine the degree and nature of weathering and soil formation.

Temperature affects the rate of decomposition of parent material, the rate of biological activity, and the rate of chemical change within both the organic and inorganic materials. When the air temperature is low, the soil temperature is correspondingly low. Under this condition plants and animals reduce their activity. This is also true of the chemical processes that take place within the parent material and soil. Precipitation affects the rate of leaching of soil particles and bases, the rate of biological activity, and the amount of material moved within the soil. It also influences the type of vegetation present, which in turn also modifies the soil. Wind dries and cools the soil. It also adds dust, which contains materials such as calcium carbonate. Wind can slow chemical reactions and biological activity by its cooling effect, thus slowing soil formation. It also acts as an erosive agent.

Climate can be either directly or indirectly responsible for variations in soil depth, soil color as a result of chemical change causing iron staining, and chemical composition as a result of added material that is blown in.

The difference between the Dioxice and Manzano soils is primarily a result of climate. They both have moderate temperatures and formed in alluvium; however, because the Manzano soils receive more moisture, they have developed a thick, dark-colored surface layer that is high in content of organic matter. This is a result of moisture affecting vegetation, which in turn modifies the soil. More grass grows on the Manzano soils, and the added moisture aids in the biological breakdown and retention of this organic material in the soil.

Wind has deposited sand on hills and ridges on which the Royosa soils formed. Soil blowing is common, and much surface soil is lost each year. Soil blowing in one place leads to deposition in another, as is evidenced by the recharge or carbonates when dust particles are deposited on and partially leached into soils downwind. The depth to which the carbonates are moved in the soil depends upon the amount of precipitation received.

Plant and Animal Life

Plant and animal life includes fungi, bacteria, earthworms, insects, rodents, vegetation, mammals, and man. The type of plants growing in a soil determines to a large extent the amount of organic matter that will eventually be in the soil. Also, the vegetation may regulate certain chemical reactions in the soil and the type of micro-organisms that are present. The Brycan and Manzano soils formed under short and mid grasses and have a relatively high content of organic matter, while soils that formed predominantly under shrubs do not have so much organic matter. The micro-organisms present in these soils are similar, but their numbers are different. The Valnor soils formed under coniferous trees with an understory of grass. The micro-organisms in these soils differ from those in soils that formed under grass because the soils under trees tend to be less alkaline. This in turn alters the chemical reactions in the soils so that bases are removed much more rapidly. Insects, rodents, and larger mammals physically mix the soil, and in extreme cases they may completely alter or change the soil from one kind to another. Man alters soils or parent material by adding fertilizer, organic matter, and excess water and by mechanically manipulating them.

Topography

The two basic parts of topography are slope and aspect. The slope of an area regulates the amount of surface drainage and infiltration when all other factors are the same; otherwise, its effect depends on or is interrelated with the texture of the soil, the type and density of vegetation present, and the climate. As the slope increases, soil formation processes decrease and the potential for erosion increases. The Catman soils, for example, are gullied in some areas where slope is 3 to 5 percent but have no gullies where slope is 0 to I percent. As the slope decreases, soil formation processes generally increase because of the greater infiltration and percolation of water through the soil and a more rapid buildup of soil material through alluvial activity. Manzano soils are deep, but they are still relatively young because they continue to receive additions of soil material. Steep soils tend to be thin because soil material is eroded away at the rate of development or somewhat slower. The Coni, Motoqua, and Tolman soils are examples of such steep soils, whereas downslope soils such as the Augustine, Bario, Gustspring, and Penistaja soils are deep and well developed.

Aspect is the direction that the slope faces. It affects the available heat present for soil development and the amount of available moisture, although these properties also depend upon other factors. If all other factors are constant, a north-facing slope is cooler and moister than is a south-facing slope. This is especially evident near transition zones of temperature and rainfall regimes.

Time

In relation to the other soil forming factors, time is very important. The length of time that climate and plants and animals act on a given parent material in an area of specific topography determines the degree of development.

Hickman and Pietown soils are young. They have not developed any clear horizons other than a surface horizon. Dioxice, Gatlin, Guy, and Jacques soils have existed long enough to allow some movement of clay and carbonates and to develop a weakly expressed B horizon or a calcic horizon, or both.

Maia, Thunderbird, Valnor, and Veteado soils have strongly developed horizons. These soils have either a thick, well expressed argillic horizon or a thick surface layer that is high in content of organic matter, or both.

Some soils develop horizons more rapidly than others because of the nature of the parent material. Very few factors remain constant, so they all must be considered when determining the formation and resulting morphology of any specific soil.

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Glossary

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as

	Inches
Very low	0 to 3.5
Low	3.5 to 5.0
Moderate	5.0 to 7.5
High	7.5 to 10
Very high	More than 10

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are

Loose. Noncoherent when dry or moist; does not hold together in a mass.

Friable. When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm. When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic. Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky. Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard. When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft. When dry, breaks into powder or individual grains under very slight pressure.

Cemented. Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained. These soils have very high and high hydraulic conductivity and low water holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained. These soils have high hydraulic conductivity and low water holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained. These soils have intermediate water holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained. These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless artificial drainage is provided. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained. These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless artificial drainage is provided. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained. These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained. These soils are wet to the surface most of the time. They are wet enough to prevent the growth of important crops (except rice) unless artificially drained.

Drainage, surface. Runoff, or surface flow of water, from an area.

Droughty. The condition inherent in some soils of low and very low available water capacity caused by shallow soil depth, rock fragment content, coarse texture, or a saline and sodic state.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fast intake (in tables). The rapid movement of water into the soil.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon. An organic layer of fresh and decaying plant residue.

A horizon. The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon. The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon. The mineral horizon in which the main feature is loss of silicate clay, iron, alluminum, or some combination of these.

C horizon. The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

R layer. Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Low strength. The soil is not strong enough to support loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Munsell notation. A designation of color by degrees of the three simple variables hue, value, and chroma. For example, a notation of 10YR 6/4 is a color in hue of 10YR, value of 6, and chroma of 4.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch

Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

	Percent
Level	0 to 1
Sloping	1 to 20
Steep	20 and higher

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 6 to 15 inches (15 to 38 centimeters) in length if flat.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1954-60 at Luna Ranger Station]

Month	Temperature		Precipitation	
	Average daily maximum	Average daily minimum	Average monthly total	Average number of days with 0.10 inch or more precipitation
	° F	° F	In	
January	46	11	1.04	4
February	50	15	0.80	3
March	55	19	0.76	2
April	64	23	0.62	1
May	72	29	0.48	1
June	82	37	0.73	2
July	83	47	2.59	8
August	80	45	2.90	8
September	76	38	1.71	2
October	67	26	1.36	4
November	57	16	0.59	1
December	49	11	0.95	1
Annual	65	26	14.50	37

TABLE 2.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
330	Tejana-Rock outcrop complex, 3 to 15 percent slopes	11,371	0.5
335	Ralphston-Amenson loams, 1 to 9 percent slopes	19,429	0.9
340	Flugle-Typic Ustorthents association, 2 to 15 percent slopes	110,695	5.0
341	Flugle-Jacques association, 1 to 5 percent slopes	12,633	0.6
347	Datil-Dioxice complex, 1 to 5 percent slopes	58,708	2.6
365	Cabezon-Thunderbird-Celsosprings complex, 3 to 25 percent slopes	75,233	3.4
366	Celsosprings stony loam, 1 to 8 percent slopes	9,008	0.4
370	Cabezon-Rock outcrop complex, 3 to 50 percent slopes	4,248	0.2
371	Smilo-Adman complex, 0 to 9 percent slopes	114,582	5.2
373	Gustspring-Guy-Typic Ustorthents complex, 1 to 10 percent slopes	22,169	1.0
375	Gustspring-Aridic Ustochrepts complex, 5 to 40 percent slopes	32,007	1.4
382	Datil gravelly fine sandy loam, 1 to 6 percent slopes	5,976	0.3
385	Aridic Argiustolls-Rock outcrop complex, 15 to 45 percent slopes	24,120	1.1
387	Rock outcrop-Aridic Ustochrepts complex, 10 to 25 percent slopes	24,442	1.1
390	Rudd-Modyon complex, 3 to 15 percent slopes	43,667	2.0
408	Hubbell loamy sand, 1 to 9 percent slopes	22,018	1.0
409	Ceniza-Gatlin complex, 1 to 15 percent slopes	14,281	0.6
411	Goesling-Celacy complex, 0 to 10 percent slopes	53,880	2.4
422	Pietown-Hickman complex, 0 to 5 percent slopes	31,706	1.4
424	Manzano clay loam, 0 to 2 percent slopes	66,470	3.0
425	Catman-Hickman complex, 1 to 5 percent slopes	90,656	4.1
459	Telescope loamy fine sand, 3 to 10 percent slopes	9,661	0.4
463	Datil-Dioxice association, moist, 3 to 15 percent slopes	8,458	0.4
471	Faraway-Motoqua-Rock outcrop complex, 8 to 30 percent slopes	49,495	2.2
472	Abrazo-Rock outcrop complex, 15 to 50 percent slopes	26,251	1.2
479	Augustine fine sandy loam, 1 to 6 percent slopes	38,005	1.7
482	Datil-Guy association, 3 to 15 percent slopes	29,084	1.3
486	Valnor-Midnight association, 1 to 25 percent slopes	4,487	0.2
487	Ustic Torriorthents-Rock outcrop-Badland complex, 20 to 100 percent slopes	99,860	4.5
492	Jacee-Celacy-Rock outcrop association, 0 to 9 percent slopes	49,792	2.2
493	Mion-Travessilla-Rock outcrop complex, 2 to 30 percent slopes	37,460	1.7
494	Catman silty clay, 0 to 2 percent slopes	80,158	3.6
495	Mion-Catman association, 2 to 17 percent slopes	13,435	0.6
497	Royosa fine sand, 3 to 15 percent slopes	2,114	0.1
517	Loarc-Telescope loamy sands, 0 to 3 percent slopes	31,248	1.4
525	Telescope loamy sand, 0 to 3 percent slopes	71,646	3.2
540	Goldust gravelly sandy clay loam, 2 to 8 percent slopes	3,772	0.2
550	Bario sandy clay loam, 0 to 5 percent slopes	20,859	0.9
551	Pleioville gravelly sandy loam, 3 to 15 percent slopes	30,253	1.4
555	Motoqua-Rock outcrop complex, 8 to 30 percent slopes	44,433	2.0
560	Maia sandy loam, 1 to 8 percent slopes	8,369	0.4
565	Celsosprings loam, 1 to 8 percent slopes	15,734	0.7
575	Joachem-Rock outcrop complex, 3 to 15 percent slopes	20,727	0.9
580	Loarc-Datil complex, moist, 2 to 20 percent slopes	74,239	3.5
585	Abrazo-Apache complex, 2 to 15 percent slopes	7,471	0.3
590	Penistaja-Viuda-Rock outcrop association, 0 to 9 percent slopes	20,424	0.9
592	Celacy-Rock outcrop complex, 2 to 9 percent slopes	28,192	1.3
595	Amenson-Gustspring loams, 2 to 7 percent slopes	4,605	0.2
606	Tolman-Rock outcrop complex, 25 to 60 percent slopes	91,519	4.1
612	Typic Argiborolls-Tolman-Motoqua association, 5 to 60 percent slopes	6,850	0.3
624	Brycan loam, 0 to 3 percent slopes	7,380	0.3
625	Coni-Tolman complex, 10 to 40 percent slopes	27,802	1.3
635	Jacee-Mion-Celacy association, 1 to 10 percent slopes	56,534	2.6
645	Albinas-Datil complex, 1 to 5 percent slopes	41,031	1.9
650	Typic Ustorthents-Hickman-Majada association, 1 to 25 percent slopes	30,478	1.4
655	Majada-Lapdun very cobbly loams, 1 to 8 percent slopes	12,403	0.6
660	Datil-Loarc association, 1 to 15 percent slopes	25,207	1.1
665	Veteado-Penistaja sandy loams, 1 to 5 percent slopes	33,605	1.5
670	Diatee-Flugle association, 1 to 9 percent slopes	26,006	1.2
671	Smilo-Adman complex, moist, 3 to 15 percent slopes	13,671	0.6
675	Loarc-Flugle-Manzano association, 1 to 9 percent slopes	60,174	2.7
680	Jacques clay loam, 1 to 5 percent slopes	3,988	0.2
690	Millpaw-Datil complex, 0 to 7 percent slopes	7,462	0.3
700	Hiarc-Loarc-Typic Ustorthents association, 1 to 9 percent slopes	33,801	1.5
705	Parquat-Tafoya association, 5 to 30 percent slopes	9,367	0.4

See footnote at end of table.

TABLE 2.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
710	Alegros-Alegros Variant complex, 1 to 10 percent slopes	7,856	0.4
715	Guy gravelly loamy fine sand, 0 to 12 percent slopes	36,805	1.7
720	Gustspring gravelly fine sandy loam, 0 to 5 percent slopes	6,669	0.3
	Water	193	*
	Total	2,216,332	100.0

* Less than 0.1 percent.

TABLE 3.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
330*:				
Tejana	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
Rock outcrop.				
335*:				
Ralphston	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Severe: erodes easily.
Amenson	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: erodes easily.
340*:				
Flugle	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Typic Ustorthents.				
341*:				
Flugle	Slight	Slight	Moderate: slope.	Slight.
Jacques	Severe: flooding.	Slight	Moderate: slope.	Slight.
347*:				
Datil	Slight	Slight	Moderate: slope, small stones.	Slight.
Dioxice	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
365*:				
Cabezon	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, depth to rock.	Slight.
Thunderbird	Moderate: slope, percs slowly, dusty.	Moderate: slope, percs slowly, dusty.	Severe: slope.	Severe: erodes easily.
Celsosprings	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.
366 Celsosprings	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: large stones, slope.	Slight.

See footnote at end of table.

TABLE 3.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
370*:				
Cabezon	Severe: too clayey, depth to rock.	Severe: too clayey, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: too clayey.
Rock outcrop.				
371*:				
Smilo	Moderate: large stones, small stones.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Moderate: large stones.
Adman	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, depth to rock.	Moderate: large stones.
373*:				
Gustspring	Slight	Slight	Moderate: slope, small stones.	Slight.
Guy	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
Typic Ustorthents.				
375*:				
Gustspring	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
Aridic Ustochrepts.				
382 Datil	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
385*:				
Aridic Argiustolls.				
Rock outcrop.				
387*:				
Rock outcrop.				
Aridic Ustochrepts.				
390*:				
Rudd	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
Modyon	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.
408 Hubbell	Slight	Slight	Moderate: slope.	Slight.
409*:				
Ceniza	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.

See footnote at end of table.

TABLE 3.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
409*:				
Gatlin	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.
411*:				
Goesling	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight.
Celacy	Slight	Slight	Severe: slope.	Slight.
422*:				
Pietown	Severe: flooding.	Moderate: percs slowly.	Moderate: slope, flooding, percs slowly.	Slight.
Hickman	Severe: flooding.	Slight	Moderate: slope, small stones, flooding.	Severe: erodes easily.
424 Manzano	Severe: flooding.	Slight	Slight	Slight.
425*:				
Catman	Severe: flooding.	Severe: percs slowly.	Severe: too clayey, percs slowly.	Moderate: too clayey.
Hickman	Severe: flooding.	Slight	Moderate: slope, small stones, flooding.	Slight.
459 Telescope	Slight	Slight	Severe: slope.	Slight.
463*:				
Datil	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
Dioxice	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: dusty.
471*:				
Faraway	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
Motoqua	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
Rock outcrop.				

See footnote at end of table.

TABLE 3.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
472*:				
Abrazo	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Rock outcrop.				
479 Augustine	Slight	Slight	Moderate: slope, small stones.	Slight.
482*:				
Datil	Slight	Slight	Severe: slope.	Slight.
Guy	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
486*:				
Valnor	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, depth to rock.	Slight.
Midnight	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
487*:				
Ustic Torriorthents.				
Rock outcrop.				
Badland.				
492*:				
Jacee	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, depth to rock, percs slowly.	Severe: erodes easily.
Celacy	Slight	Slight	Moderate: slope, depth to rock.	Slight.
Rock outcrop.				
493*:				
Mion	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
Travessilla	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: large stones, slope.
Rock outcrop.				

See footnote at end of table.

TABLE 3.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
494 Catman	Severe: flooding, too clayey, excess salt.	Severe: too clayey, excess salt.	Severe: too clayey, flooding, percs slowly.	Severe: too clayey.
495*:				
Mion	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
Catman	Severe: flooding. percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight.
497 Royosa	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
517*:				
Loarc	Slight	Slight	Slight	Slight.
Telescope	Slight	Slight	Slight	Slight.
525 Telescope	Slight	Slight	Slight	Slight.
540 Goldust	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight.
550 Bario	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight.
551 Pleioville	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
555*:				
Motoqua	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
Rock outcrop.				
560 Maia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight.
565 Celsosprings	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.
575*:				
Joachem	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
Rock outcrop.				

See footnote at end of table.

TABLE 3.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
580*:				
Loarc	Slight	Slight	Moderate: slope.	Slight.
Datil	Moderate: slope, large stones, dusty.	Moderate: slope, large stones, dusty.	Severe: large stones, slope.	Moderate: dusty.
585*:				
Abrazo	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.
Apache	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
590*:				
Penistaja	Slight	Slight	Moderate: slope.	Slight.
Viuda	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight.
Rock outcrop.				
592*:				
Celacy	Slight	Slight	Moderate: slope, depth to rock.	Slight.
Rock outcrop.				
595*:				
Amenson	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: erodes easily.
Gustspring	Slight	Slight	Moderate: slope, small stones.	Severe: erodes easily.
606*:				
Tolman	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: large stones, slope.
Rock outcrop.				
612*:				
Typic Argiborolls.				
Tolman	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: large stones, slope.
Motoqua	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope, large stones.

See footnote at end of table.

TABLE 3.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
624 Brycan	Severe: flooding.	Slight	Moderate: flooding.	Severe: erodes easily.
625*:				
Coni	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.
Tolman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.
635*:				
Jacee	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, depth to rock, percs slowly.	Severe: erodes easily.
Mion	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: erodes easily.
Celacy	Moderate: dusty.	Moderate: dusty.	Moderate: slope, depth to rock.	Severe: erodes easily.
645*:				
Albinas	Severe: flooding.	Slight	Moderate: slope.	Slight.
Datil	Slight	Slight	Moderate: slope, small stones.	Severe: erodes easily.
650*: Typic Ustorthents.				
Hickman	Severe: flooding.	Slight	Moderate: slope, small stones, flooding.	Severe: erodes easily.
Majada	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: large stones.
655*:				
Majada	Moderate: small stones.	Moderate: small stones.	Severe: large stones, small stones.	Severe: large stones.
Lapdun	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: large stones.
660*:				
Datil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Loarc	Slight	Slight	Moderate: slope.	Slight.

See footnote at end of table.

TABLE 3.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
665*:				
Veteado	Slight	Slight	Moderate: slope, small stones.	Slight.
Penistaja	Slight	Slight	Moderate: slope.	Slight.
670*:				
Diatee	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
Flugle	Slight	Slight	Severe: slope.	Severe: erodes easily.
671*:				
Smilo	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: large stones.
Adman	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Moderate: large stones.
675*:				
Loarc	Slight	Slight	Moderate: slope.	Slight.
Flugle	Slight	Slight	Moderate: slope.	Slight.
Manzano	Slight	Slight	Slight	Slight.
680 Jacques	Severe: flooding.	Slight	Moderate: slope.	Slight.
690*:				
Millpaw	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: erodes easily.
Datil	Slight	Slight	Moderate: slope, small stones.	Slight.
700*:				
Hiarc	Slight	Slight	Moderate: slope, depth to rock.	Slight.
Loarc	Slight	Slight	Moderate: slope.	Slight.
Typic Ustorthents.				
705*:				
Parquat	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Severe: large stones.
Tafoya	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.

See footnote at end of table.

TABLE 3.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
710*:				
Alegros	Moderate: large stones, small stones.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Slight.
Alegros Variant	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones.
715 Guy	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
720 Gustspring	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 4.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
330*:											
Tejana------------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Rock outcrop.											
335*:											
Ralphston---------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Amenson-----------	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
340*:											
Flugle------------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Typic Ustorthents.											
341*:											
Flugle------------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Jacques-----------	Poor	Fair	Fair	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair.
347*:											
Datil-------------	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Dioxice-----------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
365*:											
Cabezon-----------	Very poor.	Very poor.	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
Thunderbird-------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Celsosprings------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
366---------------- Celsosprings	Very poor.	Very poor.	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
370*:											
Cabezon-----------	Very poor.	Very poor.	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
Rock outcrop.											
371*:											
Smilo-------------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Adman-------------	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.

See footnote at end of table.

TABLE 4.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
373*:											
Gustspring--------	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
Guy---------------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Typic Ustorthents.											
375*:											
Gustspring--------	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Aridic Ustochrepts.											
382---------------- Datil	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
385*:											
Aridic Argiustolls.											
Rock outcrop.											
387*:											
Rock outcrop.											
Aridic Ustochrepts.											
390*:											
Rudd--------------	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
Modyon------------	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
408---------------- Hubbell	Poor	Poor	Poor	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Poor.
409*:											
Ceniza------------	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Gatlin------------	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
411*:											
Goesling----------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Celacy------------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
422*:											
Pietown-----------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Hickman-----------	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.

See footnote at end of table.

TABLE 4.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
424 Manzano	Poor	Fair	Fair	---	Poor	Poor	Very poor.	Fair	---	Very poor.	Poor.
425*:											
Catman	Poor	Fair	Poor	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Poor
Hickman	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
459 Telescope	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
463*:											
Datil	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Dioxice	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
471*:											
Faraway	Poor	Poor	Poor	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Poor.
Motoqua	Very poor.	Poor	Fair	---	Poor	---	---	Poor	---	---	Fair.
Rock outcrop.											
472*:											
Abrazo	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Rock outcrop.											
479 Augustine	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
482*:											
Datil	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Guy	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
486*:											
Valnor	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Midnight	Very poor.	Very poor.	Poor	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
487*: Ustic Torriorthents.											
Rock outcrop.											
Badland.											

See footnote at end of table.

TABLE 4.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
492*:											
Jacee	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Celacy	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Rock outcrop.											
493*:											
Mion	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Travessilla	Very poor.	Very poor.	Poor	---	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Poor.
Rock outcrop.											
494 Catman	Poor	Fair	Very poor.	---	Very poor.	Poor	Very poor.	Poor	---	Very poor.	Very poor.
495*:											
Mion	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Catman	Poor	Fair	Poor	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Poor.
497 Royosa	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Poor	Very poor.	Fair.
517*:											
Loarc	Poor	Fair	Fair	Good	Fair	Poor	Very poor.	Fair	Good	Very poor.	Fair.
Telescope	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
525 Telescope	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
540 Goldust	Poor	Very poor.	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.	Fair.
550 Bario	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
551 Pleioville	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
555*:											
Motoqua	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Poor.
Rock outcrop.											
560 Maia	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
565 Celsosprings	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.

See footnote at end of table.

TABLE 4.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
575*:											
Joachem	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Rock outcrop.											
580*:											
Loarc	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Datil	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
585*:											
Abrazo	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Apache	Very poor.	Poor	Poor	---	Poor	Poor	Very poor.	Very poor.	---	Poor	Poor.
590*:											
Penistaja	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
Viuda	Very poor.	Very poor.	Poor	---	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Poor.
Rock outcrop.											
592*:											
Celacy	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Rock outcrop.											
595*:											
Amenson	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
Gustspring	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
606*:											
Tolman	Very poor.	Poor	Good	Poor	Good	Very poor.	Very poor.	Poor	Poor	Very poor.	Good.
Rock outcrop.											
612*:											
Typic Argiborolls.											
Tolman	Very poor.	Poor	Good	Poor	Good	Very poor.	Very poor.	Poor	Poor	Very poor.	Good.
Motoqua	Very poor.	Poor	Fair	Poor	Poor	---	---	Poor	Poor	---	Fair.
624 Brycan	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Fair	Very poor.

See footnote at end of table.

TABLE 4.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
625*:											
Coni	Very poor.	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
Tolman	Very poor.	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
635*:											
Jacee	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Mion	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Celacy	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
645*:											
Albinas	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Datil	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
650*:											
Typic Ustorthents.											
Hickman	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Majada	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
655*:											
Majada	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Lapdun	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
660*:											
Datil	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Loarc	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
665*:											
Veteado	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Penistaja	Poor	Good	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
670*:											
Diatee	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Flugle	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.

See footnote at end of table.

TABLE 4.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
671*:											
Smilo	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Adman	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
675*:											
Loarc	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Flugle	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Manzano	Poor	Fair	Fair	---	Poor	Poor	Very poor.	Fair	---	Very poor.	Poor.
680 Jacques	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
690*:											
Millpaw	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Datil	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
700*:											
Hiarc	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Loarc	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Typic Ustorthents.											
705*:											
Parquat	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Tafoya	Very poor.	Very poor.	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
710*:											
Alegros	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Alegros Variant	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
715 Guy	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
720 Gustspring	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 5.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
330*:						
Tejana	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, shrink-swell.	Severe: small stones.
Rock outcrop.						
335*:						
Ralphston	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Slight.
Amenson	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: thin layer.
340*:						
Flugle	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action, shrink-swell.	Moderate: slope.
Typic Ustorthents.						
341*:						
Flugle	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.	Slight.
Jacques	Moderate: too clayey.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.	Slight.
347*:						
Datil	Slight	Slight	Slight	Slight	Slight	Slight.
Dioxice	Slight	Slight	Slight	Slight	Slight	Moderate: small stones.
365*:						
Cabezon	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength.	Severe: thin layer.
Thunderbird	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: large stones, slope, thin layer.
Celsosprings	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Slight.
366 Celsosprings	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.	Moderate: large stones.

See footnote at end of table.

TABLE 5.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
370*:						
Cabezon	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, shrink-swell.	Severe: thin layer, too clayey.
Rock outcrop.						
371*:						
Smilo	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: small stones, large stones.
Adman	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, low strength, shrink-swell.	Severe: thin layer.
373*:						
Gustspring	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
Guy	Slight	Slight	Slight	Moderate: slope.	Slight	Moderate: small stones, large stones, droughty.
Typic Ustorthents.						
375*:						
Gustspring	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
Aridic Ustochrepts.						
382 Datil	Slight	Slight	Slight	Slight	Slight	Moderate: small stones.
385*: Aridic Argiustolls.						
Rock outcrop.						
387*: Rock outcrop.						
Aridic Ustochrepts.						
390*:						
Rudd	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Modyon	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Moderate: large stones, droughty, slope.
408 Hubbell	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.

See footnote at end of table.

TABLE 5.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
409*:						
Ceniza	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
Gatlin	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
411*:						
Goesling	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Slight.
Celacy	Moderate: depth to rock.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.	Moderate: thin layer.
422*:						
Pietown	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Hickman	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
424 Manzano	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.	Slight.
425*:						
Catman	Moderate: too clayey, flooding.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: too clayey.
Hickman	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
459 Telescope	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Slight.
463*:						
Datil	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, slope.
Dioxice	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, slope.
471*:						
Faraway	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: large stones, droughty, slope.
Motoqua	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: large stones, slope, thin layer.
Rock outcrop.						

See footnote at end of table.

TABLE 5.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
472*:						
Abrazo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
479 Augustine	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Slight.
482*:						
Datil	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
Guy	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, large stones, droughty.
486*:						
Valnor	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: thin layer.
Midnight	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: small stones, thin layer.
487*:						
Ustic Torriorthents.						
Rock outcrop.						
Badland.						
492*:						
Jacee	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: thin layer.
Celacy	Moderate: depth to rock.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.	Moderate: thin layer.
Rock outcrop.						
493*:						
Mion	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope, thin layer.
Travessilla	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope, thin layer.
Rock outcrop.						
494 Catman	Moderate: too clayey, flooding.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: excess salt, flooding, too clayey.

See footnote at end of table.

TABLE 5.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
495*: Mion	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Severe: thin layer.
Catman	Moderate: too clayey, flooding.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Moderate: excess salt, flooding.
497 Royosa	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
517*: Loarc	Slight	Slight	Slight	Slight	Slight	Moderate: droughty.
Telescope	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
525 Telescope	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
540 Goldust	Moderate: too clayey, large stones.	Moderate: shrink-swell, large stones.	Moderate: large stones. shrink-swell.	Moderate: shrink-swell, slope, large stones.	Moderate: shrink-swell, large stones.	Moderate: small stones, large stones.
550 Bario	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
551 Pleioville	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Moderate: slope, shrink-swell.	Moderate: small stones, slope, thin layer.
555*: Motoqua	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: small stones, slope.
Rock outcrop.						
560 Maia	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Moderate: frost action.	Slight.
565 Celsosprings	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	moderate: small stones.
575*: Joachem	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Rock outcrop.						
580*: Loarc	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.

See footnote at end of table.

TABLE 5.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
580*:						
Datil	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
585*:						
Abrazo	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: thin layer.
Apache	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
590*:						
Penistaja	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Slight.
Viuda	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: thin layer.
Rock outcrop.						
592*:						
Celacy	Moderate: depth to rock.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.	Moderate: thin layer.
Rock outcrop.						
595*:						
Amenson	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: thin layer.
Gustspring	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
606*:						
Tolman	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: large stones, slope, thin layer.
Rock outcrop.						
612*:						
Typic Argiborolls.						
Tolman	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: large stones, slope, thin layer.
Motoqua	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: large stones, slope, thin layer.
624 Brycan	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

See footnote at end of table.

TABLE 5.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
625*:						
Coni	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope, thin layer.
Tolman	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: large stones, slope, thin layer.
635*:						
Jacee	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: thin layer.
Mion	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Severe: thin layer.
Celacy	Moderate: depth to rock.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.	Moderate: thin layer.
645*:						
Albinas	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.	Slight.
Datil	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Slight	Slight.
650*: Typic Ustorthents.						
Hickman	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Majada	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
655*:						
Majada	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
Lapdun	Moderate: large stones.	Moderate: shrink-swell, large stones.	Moderate: shrink-swell, large stones.	Moderate: shrink-swell, slope, large stones.	Moderate: shrink-swell, large stones.	Severe: large stones.
660*:						
Datil	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Loarc	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
665*:						
Veteado	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Slight.
Penistaja	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Slight.

See footnote at end of table.

TABLE 5.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
670*: Diatee	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Moderate: small stones, large stones.
Flugle	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.	Slight.
671*: Smilo	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: small stones, large stones, slope.
Adman	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, shrink-swell.	Severe: thin layer.
675*: Loarc	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
Flugle	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.	Slight.
Manzano	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.	Slight.
680 Jacques	Moderate: too clayey, flooding.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Moderate: flooding.
690*: Millpaw	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Datil	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
700*: Hiarc	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Moderate: depth to rock, frost action.	Moderate: thin layer.
Loarc	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
Typic Ustorthents.						
705*: Parquat	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Severe: large stones.
Tafoya	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 5.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
710*:						
Alegros----------	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: small stones, large stones, droughty.
Alegros Variant--	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: large stones.	Severe: small stones, large stones.
715--------------- Guy	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: small stones, large stones, droughty.
720--------------- Gustsspring	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Moderate: small stones, large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
330*:					
Tejana	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: seepage, slope.	Fair: slope.
Rock outcrop.					
335*:					
Ralphston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Amenson	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
340*:					
Flugle	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Typic Ustorthents.					
341*:					
Flugle	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Jacques	Severe: percs slowly.	Severe: flooding.	Severe: too clayey.	Moderate: flooding.	Poor: too clayey.
347*:					
Datil	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Dioxice	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Poor: small stones.
365*:					
Cabezon	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Thunderbird	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Celsosprings	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
366 Celsosprings	Severe: percs slowly.	Moderate: slope, large stones.	Moderate: too clayey, large stones.	Slight	Fair: too clayey.

See footnote at end of table.

TABLE 6.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
370*:					
Cabezon	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Rock outcrop.					
371*:					
Smilo	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Adman	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
373*:					
Gustspring	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Guy	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
Typic Ustorthents.					
375*:					
Gustspring	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Aridic Ustochrepts.					
382 Datil	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
385*:					
Aridic Argiustolls.					
Rock outcrop.					
387*:					
Rock outcrop.					
Aridic Ustochrepts.					
390*:					
Rudd	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Modyon	Severe: depth to rock.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim, large stones.
408 Hubbell	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.

See footnote at end of table.

TABLE 6.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
409*:					
Ceniza	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
Gatlin	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
411*:					
Goesling	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
Celacy	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
422*:					
Pietown	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, too clayey, too sandy.	Severe: flooding.	Poor: too clayey, too sandy.
Hickman	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
424 Manzano	Severe: percs slowly.	Severe: flooding.	Severe: seepage.	Moderate: flooding.	Fair: too clayey.
425*:					
Catman	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, too clayey.	Severe: flooding.	Poor: too clayey, hard to pack.
Hickman	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
459 Telescope	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
463*:					
Datil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Dioxice	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.
471*:					
Faraway	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Motoqua	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 6.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
472*:					
Abrazo	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, large stones.
Rock outcrop.					
479 Augustine	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
482*:					
Datil	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Guy	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
486*:					
Valnor	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Midnight	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
487*:					
Ustic Torriorthents.					
Rock outcrop.					
Badland.					
492*:					
Jacee	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey.
Celacy	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
Rock outcrop.					
493*:					
Mion	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Travessilla	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					
494 Catman	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, too clayey.	Severe: flooding.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 6.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
495*:					
Mion	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Catman	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, too clayey.	Severe: flooding.	Poor: too clayey, hard to pack.
497 Royosa	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
517*:					
Loarc	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
Telescope	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
525 Telescope	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
540 Goldust	Severe: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
550 Bario	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
551 Pleioville	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, small stones.
555*:					
Motoqua	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Rock outcrop.					
560 Maia	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
565 Celsosprings	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
575*:					
Joachem	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Rock outcrop.					
580*:					
Loarc	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
Datil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.

See footnote at end of table.

TABLE 6.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
585*:					
Abrazo	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Apache	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
590*:					
Penistaja	Moderate: percs slowly.	Severe: seepage.	Slight	Slight	Good.
Viuda	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
Rock outcrop.					
592*:					
Celacy	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
Rock outcrop.					
595*:					
Amenson	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
Gustspring	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
606*:					
Tolman	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Rock outcrop.					
612*:					
Typic Argiborolls.					
Tolman	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Motoqua	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
624 Brycan	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
625*:					
Coni	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 6.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
625*:					
Tolman	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
635*:					
Jacee	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey.
Mion	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Celacy	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
645*:					
Albinas	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
Datil	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
650*:					
Typic Ustorthents.					
Hickman	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
Majada	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.
655*:					
Majada	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight	Poor: large stones.
Lapdun	Moderate: percs slowly.	Moderate: seepage, slope, large stones.	Moderate: too clayey, large stones.	Slight	Poor: small stones.
660*:					
Datil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Loarc	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
665*:					
Veteado	Severe: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Penistaja	Moderate: percs slowly.	Severe: seepage.	Slight	Slight	Good.

See footnote at end of table.

TABLE 6.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
670*:					
Diatee	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Flugle	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
671*:					
Smilo	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Adman	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
675*:					
Loarc	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
Flugle	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Manzano	Severe: percs slowly.	Moderate: seepage.	Severe: seepage.	Slight	Fair: too clayey.
680 Jacques	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, too clayey.	Severe: flooding.	Poor: too clayey.
690*:					
Millpaw	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Datil	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
700*:					
Hiarc	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
Loarc	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
Typic Ustorthents.					
705*:					
Parquat	Severe: poor filter.	Severe: seepage, slope, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: large stones.
Tafoya	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.

See footnote at end of table.

TABLE 6.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
710*:					
Alegros------------	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
Alegros Variant----	Severe: poor filter.	Severe: seepage, large stones.	Severe: seepage.	Severe: seepage.	Poor: large stones.
715----------------- Guy	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
720----------------- Gustspring	Severe: poor filter.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
330*:				
Tejana	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Rock outcrop.				
335*:				
Ralphston	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Amenson	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
340*:				
Flugle	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Typic Ustorthents.				
341*:				
Flugle	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Jacques	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
347*:				
Datil	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Dioxice	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
365*:				
Cabezon	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones.
Thunderbird	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Celsosprings	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
366 Celsosprings	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
370*:				
Cabezon	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, thin layer.
Rock outcrop.				

See footnote at end of table.

TABLE 7.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
371*:				
Smilo	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Adman	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones.
373*:				
Gustspring	Good	Probable	Probable	Poor: small stones, area reclaim.
Guy	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Typic Ustorthents.				
375*:				
Gustspring	Good	Probable	Probable	Poor: small stones, area reclaim.
Aridic Ustochrepts.				
382 Datil	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
385*:				
Aridic Argiustolls.				
Rock outcrop.				
387*:				
Rock outcrop.				
Aridic Ustochrepts.				
390*:				
Rudd	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Modyon	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
408 Hubbell	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
409*:				
Ceniza	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Gatlin	Good	Probable	Probable	Poor: small stones, area reclaim.
411*:				
Goesling	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.

See footnote at end of table.

TABLE 7.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
411*:				
Celacy	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
422*:				
Pietown	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Hickman	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
424 Manzano	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
425*:				
Catman	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Hickman	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
459 Telescope	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
463*:				
Datil	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Dioxice	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
471*:				
Faraway	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
Motoqua	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
Rock outcrop.				
472*:				
Abrazo	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
479 Augustine	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
482*:				
Datil	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 7.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
482*:				
Guy	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
486*:				
Valnor	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Midnight	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
487*:				
Ustic Torriorthents.				
Rock outcrop.				
Badland.				
492*:				
Jacee	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Celacy	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
Rock outcrop.				
493*:				
Mion	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Travessilla	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
494 Catman	Poor: low strength, shrink-swell,	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess salt.
495*:				
Mion	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Catman	Poor: low strength, shrink-swell,	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
497 Royosa	Good	Probable	Improbable: too sandy.	Poor: too sandy.

See footnote at end of table.

TABLE 7.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
517*:				
Loarc	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
Telescope	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
525 Telescope	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
540 Goldust	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
550 Bario	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
551 Pleioville	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
555*:				
Motoqua	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
Rock outcrop.				
560 Maia	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
565 Celsosprings	Poor: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
575*:				
Joachem	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Rock outcrop.				
580*:				
Loarc	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
Datil	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
585*:				
Abrazo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Apache	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
590*:				
Penistaja	Good	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 7.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
590*:				
Viuda	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Rock outcrop.				
592*:				
Celacy	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too sandy, small stones.
Rock outcrop.				
595*:				
Amenson	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Gustspring	Good	Probable	Probable	Poor: small stones, area reclaim.
606*:				
Tolman	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
Rock outcrop.				
612*:				
Typic Argiborolls.				
Tolman	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
Motoqua	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
624 Brycan	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
625*:				
Coni	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Tolman	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
635*:				
Jacee	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 7.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
635*:				
Mion	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Celacy	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
645*:				
Albinas	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
Datil	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
650*:				
Typic Ustorthents.				
Hickman	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Majada	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
655*:				
Majada	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.
Lapdun	Fair: shrink-swell, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim.
660*:				
Datil	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Loarc	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
665*:				
Veteado	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Penistaja	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
670*:				
Diatee	Good	Probable	Probable	Poor: small stones, area reclaim.
Flugle	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
671*:				
Smilo	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 7.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
671*:				
Adman	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones.
675*:				
Loarc	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
Flugle	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Manzano	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
680 Jacques	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
690*:				
Millpaw	Poor: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Datil	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
700*:				
Hiarc	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Loarc	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
Typic Ustorthents.				
705*:				
Parquat	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Tafoya	Fair: shrink-swell, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
710*:				
Alegros	Good	Probable	Probable	Poor: small stones, area reclaim.
Alegros Variant	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
715 Guy	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
720 Gustspring	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Terraces and diversions	Grassed waterways
330*:				
Tejana	Severe: seepage, slope.	Moderate: piping.	Slope	Slope.
Rock outcrop.				
335*:				
Ralphston	Moderate: seepage, slope.	Severe: piping.	Erodes easily	Erodes easily.
Amenson	Severe: cemented pan.	Severe: thin layer.	Depth to rock, cemented pan.	Erodes easily, depth to rock.
340*:				
Flugle	Severe: slope.	Severe: piping.	Slope, erodes easily, soil blowing.	Slope, erodes easily.
Typic Ustorthents.				
341*:				
Flugle	Moderate: seepage, slope.	Severe: piping.	Erodes easily, soil blowing.	Erodes easily.
Jacques	Slight	Slight	Percs slowly	Percs slowly.
347*:				
Datil	Moderate: seepage, slope.	Severe: piping.	Favorable	Favorable.
Dioxice	Moderate: seepage, slope.	Severe: piping.	Erodes easily	Erodes easily.
365*:				
Cabezon	Severe: depth to rock, slope.	Severe: thin layer.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Thunderbird	Severe: slope.	Severe: thin layer.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Celsosprings	Moderate: seepage, slope.	Severe: piping.	Erodes easily	Large stones, erodes easily, percs slowly.
366 Celsosprings	Moderate: slope.	Moderate: piping, large stones.	Large stones	Large stones, percs slowly.
370*:				
Cabezon	Severe: depth to rock, slope.	Severe: thin layer.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Rock outcrop.				

See footnote at end of table.

TABLE 8.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Terraces and diversions	Grassed waterways
371*:				
Smilo	Moderate: depth to rock.	Severe: thin layer.	Large stones, depth to rock.	Large stones, erodes easily.
Adman	Severe: depth to rock.	Severe: thin layer.	Large stones, depth to rock.	Large stones, depth to rock.
373*:				
Gustspring	Severe: seepage.	Severe: seepage.	Large stones	Large stones.
Guy	Severe: seepage.	Moderate: piping.	Favorable	Droughty.
Typic Ustorthents.				
375*:				
Gustspring	Severe: seepage, slope.	Severe: seepage.	Slope, large stones.	Large stones, slope.
Aridic Ustochrepts.				
382 Datil	Moderate: seepage, slope.	Severe: piping.	Favorable	Favorable.
385*:				
Aridic Argiustolls.				
Rock outcrop.				
387*:				
Rock outcrop.				
Aridic Ustochrepts.				
390*:				
Rudd	Severe: depth to rock, slope.	Severe: thin layer.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Modyon	Severe: slope.	Severe: large stones.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
408 Hubbell	Severe: seepage.	Severe: seepage, piping.	Too sandy, soil blowing.	Droughty.
409*:				
Ceniza	Severe: seepage, slope.	Severe: seepage.	Slope	Slope, droughty.
Gatlin	Severe: seepage, slope.	Severe: seepage.	Slope, too sandy.	Slope, droughty.
411*:				
Goesling	Moderate: slope.	Slight	Favorable	Favorable.

See footnote at end of table.

TABLE 8.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Terraces and diversions	Grassed waterways
411*:				
Celacy	Moderate: seepage, depth to rock, slope.	Severe: piping.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
422*:				
Pietown	Slight	Severe: piping.	Too sandy, soil blowing.	Favorable.
Hickman	Slight	Moderate: piping.	Erodes easily, soil blowing.	Erodes easily.
424 Manzano	Slight	Severe: piping.	Favorable	Favorable.
425*:				
Catman	Moderate: seepage, slope.	Moderate: thin layer, hard to pack.	Erodes easily, percs slowly.	Excess salt, erodes easily, percs slowly.
Hickman	Moderate: slope.	Severe: piping.	Erodes easily	Favorable.
459 Telescope	Severe: seepage.	Severe: piping.	Soil blowing	Favorable.
463*:				
Datil	Severe: slope.	Severe: piping.	Slope	Slope.
Dioxice	Severe: slope.	Severe: piping.	Slope	Slope.
471*:				
Faraway	Severe: depth to rock, slope.	Severe: large stones.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Motoqua	Severe: depth to rock, slope.	Severe: large stones.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.				
472*:				
Abrazo	Severe: slope.	Severe: thin layer.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Rock outcrop.				
479 Augustine	Moderate: seepage, slope.	Severe: piping.	Favorable	Favorable.
482*:				
Datil	Moderate: seepage, slope.	Severe: piping.	Favorable	Favorable.
Guy	Severe: seepage, slope.	Moderate: piping.	Slope	Slope, droughty.

See footnote at end of table.

TABLE 8.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Terraces and diversions	Grassed waterways
486*:				
Valnor	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack.	Depth to rock, erodes easily, soil blowing.	Erodes easily, depth to rock, percs slowly.
Midnight	Severe: depth to rock, slope.	Severe: thin layer.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
487*:				
Ustic Torriorthents.				
Rock outcrop.				
Badland.				
492*:				
Jacee	Moderate: depth to rock.	Severe: thin layer.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
Celacy	Moderate: seepage, depth to rock, slope.	Severe: piping.	Depth to rock, erodes easily, soil blowing.	Erodes easily, depth to rock.
Rock outcrop.				
493*:				
Mion	Severe: depth to rock, slope.	Severe: thin layer.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
Travessilla	Severe: depth to rock, slope.	Severe: thin layer.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.				
494 Catman	Slight	Severe: hard to pack.	Percs slowly	Excess salt, percs slowly.
495*:				
Mion	Severe: depth to rock, slope.	Severe: thin layer.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
Catman	Moderate: slope.	Moderate: thin layer, hard to pack.	Erodes easily, percs slowly.	Excess salt, erodes easily, percs slowly.
497 Royosa	Severe: seepage, slope.	Severe: seepage, piping.	Slope, too sandy, soil blowing.	Slope, droughty.
517*:				
Loarc	Severe: seepage.	Moderate: seepage.	Soil blowing	Favorable.
Telescope	Severe: seepage.	Severe: piping.	Soil blowing	Favorable.
525 Telescope	Severe: seepage.	Severe: piping.	Soil blowing	Favorable.
540 Goldust	Severe: seepage.	Severe: seepage.	Large stones	Large stones, droughty.

See footnote at end of table.

TABLE 8.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Terraces and diversions	Grassed waterways
550 Bario	Slight	Moderate: hard to pack.	Favorable	Favorable.
551 Pleioville	Severe: slope.	Severe: thin layer.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
555*: Motoqua	Severe: depth to rock, slope.	Severe: large stones.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.				
560 Maia	Severe: seepage.	Slight	Soil blowing	Favorable.
565 Celsosprings	Moderate: seepage, slope.	Slight	Erodes easily	Large stones, erodes easily, percs slowly.
575*: Joachem	Severe: depth to rock, slope.	Severe: thin layer.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.				
580*: Loarc	Severe: seepage.	Moderate: seepage.	Soil blowing	Favorable.
Datil	Severe: slope.	Severe: piping.	Slope	Slope.
585*: Abrazo	Moderate: depth to rock, slope.	Severe: thin layer.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
Apache	Severe: depth to rock, slope.	Severe: thin layer.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
590*: Penistaja	Severe: seepage.	Severe: piping.	Soil blowing	Favorable.
Viuda	Severe: depth to rock.	Severe: thin layer.	Depth to rock	Depth to rock, percs slowly.
Rock outcrop.				
592*: Celacy	Moderate: seepage, depth to rock, slope.	Severe: piping.	Depth to rock, erodes easily, soil blowing.	Erodes easily, depth to rock.
Rock outcrop.				
595*: Amenson	Severe: cemented pan.	Severe: thin layer.	Depth to rock, cemented pan.	Erodes easily, depth to rock.
Gustspring	Severe: seepage.	Severe: seepage.	Large stones, erodes easily.	Large stones, erodes easily.

See footnote at end of table.

TABLE 8.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Terraces and diversions	Grassed waterways
606*:				
Tolman	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.				
612*: Typic Argiborolls.				
Tolman	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Motoqua	Severe: depth to rock, slope.	Severe: large stones, thin layer.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
624 Brycan	Moderate: seepage.	Severe: piping.	Erodes easily	Erodes easily.
625*:				
Coni	Severe: depth to rock, slope.	Severe: thin layer.	Slope, depth to rock.	Slope, depth to rock.
Tolman	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
635*:				
Jacee	Moderate: depth to rock, slope.	Severe: thin layer.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
Mion	Severe: depth to rock.	Severe: thin layer.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
Celacy	Moderate: seepage, depth to rock, slope.	Severe: piping.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
645*:				
Albinas	Moderate: seepage, slope.	Severe: piping.	Erodes easily	Erodes easily.
Datil	Moderate: seepage, slope.	Severe: piping.	Erodes easily	Erodes easily.
650*: Typic Ustorthents.				
Hickman	Slight	Severe: piping.	Erodes easily	Erodes easily.
Majada	Severe: slope.	Severe: large stones.	Slope, large stones.	Large stones, slope, droughty.
655*:				
Majada	Moderate: seepage, slope.	Severe: large stones.	Large stones	Large stones, droughty.

See footnote at end of table.

TABLE 8.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Terraces and diversions	Grassed waterways
655*: Lapdun	Moderate: seepage, slope.	Severe: large stones.	Large stones	Large stones.
660*: Datil	Severe: slope.	Severe: piping.	Slope, soil blowing.	Slope.
Loarc	Severe: seepage.	Moderate: seepage.	Soil blowing	Favorable.
665*: Veteado	Moderate: seepage.	Slight	Favorable	Percs slowly.
Penistaja	Severe: seepage.	Severe: piping.	Soil blowing	Favorable.
670*: Diatee	Severe: seepage.	Severe: seepage.	Large stones, too sandy.	Large stones, droughty.
Flugle	Moderate: seepage, slope.	Severe: piping.	Erodes easily	Erodes easily.
671*: Smilo	Severe: slope.	Severe: thin layer.	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
Adman	Severe: depth to rock, slope.	Severe: thin layer.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
675*: Loarc	Severe: seepage.	Moderate: seepage.	Soil blowing	Favorable.
Flugle	Moderate: seepage, slope.	Severe: piping.	Erodes easily, soil blowing.	Erodes easily.
Manzano	Slight	Severe: piping.	Favorable	Favorable.
680 Jacques	Slight	Slight	Percs slowly	Percs slowly.
690*: Millpaw	Moderate: seepage, slope.	Moderate: thin layer, hard to pack.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Datil	Moderate: seepage, slope.	Severe: piping.	Soil blowing	Favorable.
700*: Hiarc	Moderate: seepage, depth to rock, slope.	Severe: piping.	Depth to rock, erodes easily, soil blowing.	Erodes easily, depth to rock.

See footnote at end of table.

TABLE 8.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Terraces and diversions	Grassed waterways
700*:				
Loarc	Severe: seepage.	Moderate: seepage.	Soil blowing	Favorable.
Typic Ustorthents.				
705*:				
Parquat	Severe: seepage, slope.	Severe: seepage, large stones.	Slope, large stones, too sandy.	Large stones, slope, droughty.
Tafoya	Severe: slope.	Severe: large stones.	Slope, large stones, percs slowly.	Large stones, slope, droughty.
710*:				
Alegros	Severe: seepage.	Severe: seepage.	Large stones	Large stones, droughty.
Alegros Variant	Severe: seepage.	Moderate: seepage, piping, large stones.	Large stones, too sandy.	Large stones, droughty.
715 Guy	Severe: seepage.	Moderate: piping.	Soil blowing	Droughty.
720 Gustspring	Severe: seepage.	Severe: seepage.	Large stones, too sandy.	Large stones, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
330*:											
Tejana----------	0-4	Very gravelly loam.	GM-GC	A-2	0	45-65	35-50	35-45	25-35	25-30	5-10
	4-24	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	CL-ML, CL, GM-GC, GC	A-4, A-6	0	60-70	50-60	50-60	45-55	25-35	5-15
	24-60	Sandy clay loam	CL, SC	A-6	0	95-100	85-100	50-70	45-55	30-35	10-15
Rock outcrop.											
335*:											
Ralphston-------	0-2	Loam-------------	ML	A-4	0	85-100	75-100	60-75	50-65	20-25	NP-5
	2-13	Loam, sandy clay loam.	SM-SC, CL-ML	A-4	0	85-100	75-100	60-70	45-55	25-30	5-10
	13-60	Stratified loam to clay loam.	CL, CL-ML	A-6, A-4	0	85-100	75-100	65-75	55-65	25-35	5-15
Amenson---------	0-3	Loam-------------	ML, CL-ML	A-4	0	95-100	95-100	70-85	55-70	20-30	NP-10
	3-15	Clay loam, gravelly loam.	CL	A-6	0	75-95	70-85	65-75	50-65	30-40	10-15
	15	Indurated--------	---	---	---	---	---	---	---	---	---
340*:											
Flugle----------	0-3	Fine sandy loam	SM	A-2, A-4	0	100	90-100	50-60	30-40	20-25	NP-5
	3-22	Sandy clay loam, clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	90-100	60-80	40-60	25-35	5-15
	22-60	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	90-100	50-60	30-40	20-25	NP-5
Typic Ustorthents.											
341*:											
Flugle----------	0-1	Sandy loam-------	SM, SM-SC	A-4	0	100	90-100	60-70	40-50	20-25	NP-10
	1-21	Sandy clay loam, clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	90-100	60-80	40-60	25-35	5-15
	21-60	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	90-100	50-60	30-40	20-25	NP-5
Jacques---------	0-2	Clay loam--------	ML	A-6, A-7	0	100	100	90-100	70-80	35-45	10-15
	2-60	Clay, clay loam, silty clay.	CL	A-7	0	100	100	90-100	70-90	40-50	15-25
347*:											
Datil-----------	0-4	Fine sandy loam	SM	A-2, A-4	0	80-90	75-85	50-70	25-45	15-20	NP-5
	4-20	Gravelly clay loam, clay loam, sandy clay loam.	SM-SC, SC	A-4, A-6	0-5	70-80	65-80	50-60	35-50	25-35	5-15
	20-60	Gravelly loam, gravelly sandy clay loam, gravelly sandy loam.	SM-SC, GM-GC	A-2, A-4	0-5	65-75	60-70	50-65	30-45	25-30	5-10
Dioxice---------	0-4	Gravelly sandy loam.	SM, GM	A-2, A-4	0	60-80	55-75	40-55	25-40	20-25	NP-5
	4-14	Gravelly loam----	CL-ML, SM-SC, GM-GC	A-4	0	65-80	60-75	50-65	45-60	25-30	5-10
	14-60	Gravelly sandy loam, loam, gravelly loam.	CL-ML, SM-SC, GM-GC	A-4	0-15	70-90	65-85	50-65	40-55	25-30	5-10

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
365*:											
Cabezon---------	0-4	Cobbly clay loam	CL	A-6	15-25	85-95	80-90	75-90	55-70	30-35	10-15
	4-19	Clay, cobbly clay, clay loam.	CL, CH	A-6, A-7	5-20	85-95	80-90	70-90	60-80	35-55	15-30
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Thunderbird-----	0-5	Loam-------------	CL-ML	A-4	0-10	95-100	90-100	75-85	60-75	25-30	5-10
	5-23	Clay, clay loam	CL, CH	A-7	0-10	95-100	90-100	80-90	60-85	40-60	25-35
	23	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Celsosprings----	0-4	Silt loam--------	CL-ML	A-4	0-5	95-100	90-100	80-95	65-80	25-30	5-10
	4-32	Clay loam, clay	CL	A-7	0-10	95-100	90-100	85-95	70-85	40-50	15-25
	32-60	Gravelly clay loam, loam, gravelly loam.	CL-ML, SM-SC, GM-GC	A-6, A-4	0-10	70-90	65-85	55-65	45-60	25-40	5-15
366-------------- Celsosprings	0-4	Stony loam-------	ML, CL-ML	A-4	15-25	85-95	80-90	70-85	50-70	25-35	5-10
	4-32	Cobbly clay loam, cobbly clay.	CL	A-6, A-7	15-25	85-95	80-90	70-90	60-80	35-45	15-30
	32-60	Clay loam, loam	CL	A-6	0-10	95-100	90-100	70-85	60-70	30-40	10-15
370*:											
Cabezon---------	0-4	Cobbly loam------	ML, CL-ML	A-4	15-25	85-95	80-90	70-85	50-70	25-35	5-10
	4-10	Clay, cobbly clay loam.	CL, CH	A-6, A-7	5-20	85-95	80-90	70-90	60-80	35-55	15-30
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
371*:											
Smilo-----------	0-2	Cobbly sandy loam	SM	A-2, A-4	15-30	75-95	70-90	45-65	25-40	20-25	NP-5
	2-8	Loam, clay loam, sandy clay loam.	CL, CL-ML	A-4, A-6	0	80-95	75-90	70-80	60-70	25-35	5-15
	8-25	Cobbly clay loam, cobbly clay.	CL, CH	A-7	15-30	75-95	70-90	70-80	65-75	40-55	20-40
	25-32	Gravelly clay, cobbly clay, gravelly clay loam.	CL, CH	A-7	10-25	70-90	65-85	60-75	50-70	40-55	20-40
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Adman-----------	0-2	Cobbly loam------	ML, CL-ML	A-4	20-30	85-95	80-90	75-90	65-80	25-35	5-10
	2-15	Gravelly clay, cobbly clay, cobbly clay loam.	CH	A-7	10-30	75-95	70-90	65-85	60-80	50-60	25-35
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
373*:											
Gustspring------	0-2	Loamy sand-------	SM	A-2	0-5	90-95	85-90	50-65	20-35	---	NP
	2-11	Gravelly sandy clay loam, gravelly clay loam, gravelly loam.	GM-GC, GC, SM-SC, CL	A-4, A-6	10-15	65-90	60-85	50-65	40-55	25-35	5-15
	11-22	Gravelly loamy coarse sand, gravelly sandy loam.	SM	A-1	10-15	65-70	60-65	35-45	10-25	20-25	NP-5
	22-60	Extremely gravelly loamy coarse sand, very gravelly coarse sand.	GP, SP, GP-GM, SP-SM	A-1	15-30	30-65	25-60	10-25	0-10	---	NP
Guy-------------	0-15	Gravelly sandy loam.	GM, SM	A-1, A-2, A-4	0-10	60-80	55-75	35-50	20-40	15-25	NP-5
	15-60	Gravelly sandy loam, gravelly loam.	GM, SM	A-2, A-4	10-15	65-90	60-85	40-60	30-45	15-25	NP-5
Typic Ustorthents.											
375*:											
Gustspring------	0-2	Very gravelly sandy loam.	GM, SM	A-1, A-2	15-25	40-65	35-60	25-40	15-30	20-25	NP-5
	2-9	Gravelly sandy clay loam, gravelly clay loam, gravelly loam.	GM-GC, GC, SM-SC, CL	A-4, A-6	10-15	65-90	60-85	50-65	40-55	25-35	5-15
	9-14	Gravelly loamy coarse sand, gravelly sandy loam.	SM	A-1	10-15	65-70	60-65	35-45	10-25	20-25	NP-5
	14-60	Extremely gravelly loamy coarse sand, very gravelly loamy sand.	GP, SP, GP-GM, SP-SM	A-1	15-30	30-65	25-60	10-25	0-10	---	NP
Aridic Ustochrepts.											
382-------------- Datil	0-3	Gravelly fine sandy loam.	GM, SM, GM-GC, SM-SC	A-1, A-2, A-4	0-5	60-80	55-75	40-60	20-40	15-25	NP-10
	3-22	Gravelly clay loam, clay loam, sandy clay loam.	SM-SC, SC	A-4, A-6	0-5	70-80	65-75	50-60	35-50	25-35	5-15
	22-60	Gravelly loam, gravelly sandy clay loam, gravelly sandy loam.	SM-SC, GM-GC	A-2, A-4	0-5	65-75	60-70	50-65	30-45	25-30	5-10
385*:											
Aridic Argiustolls.											
Rock outcrop.											

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
387*: Rock outcrop.											
Aridic Ustochrepts.											
390*: Rudd----------	0-8	Gravelly loam----	ML	A-4	10-15	65-90	60-85	55-70	50-60	25-30	NP-5
	8-20	Very stony loam, very gravelly clay loam, very cobbly clay loam.	GM-GC	A-2, A-4	15-30	40-65	35-60	30-50	25-45	25-30	5-10
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Modyon----------	0-3	Cobbly loam------	CL-ML	A-4	15-30	85-95	80-90	65-80	50-65	25-30	5-10
	3-16	Very cobbly clay loam, very cobbly loam.	CL, CL-ML, SM-SC, GM-GC	A-4, A-6	40-50	70-85	65-80	50-70	45-60	25-35	5-15
	16-28	Very cobbly loam, very cobbly sandy loam, very cobbly sandy clay loam.	GM-GC, SM-SC, SC, GC	A-2	40-50	60-70	55-65	35-50	25-35	25-30	5-15
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
408------------ Hubbell	0-4	Loamy sand-------	SM	A-2	0	100	90-100	50-65	20-25	---	NP
	4-60	Stratified loamy sand to loam.	SM	A-2	0	100	90-100	50-65	15-35	15-25	NP-5
409*: Ceniza----------	0-6	Extremely gravelly loam.	GP-GM, SP-SM, GM, SM	A-1	0	50-60	10-20	10-20	5-15	25-30	NP-5
	6-30	Extremely gravelly sandy loam, very gravelly loam.	GM	A-1	0	30-60	20-50	20-30	10-25	25-30	NP-5
	30-42	Cinders----------	GP, SP	A-1	0	45-55	0-5	0-5	0-5	---	NP
	42-60	Sandy clay loam	SM-SC	A-4	0	95-100	90-95	65-80	35-50	25-30	5-10
Gatlin----------	0-4	Very gravelly loam.	GM-GC, GM	A-1, A-2	0	50-65	30-45	25-35	15-35	25-30	NP-10
	4-10	Very gravelly loam, very gravelly clay loam.	GM-GC, SM-SC, GC, SC	A-2	0	55-70	40-50	30-45	20-35	25-35	5-15
	10-60	Extremely gravelly coarse sand, very gravelly loamy coarse sand.	GP, SP, GP-GM, SP-SM	A-1	0	30-60	15-30	5-20	0-10	---	NP
411*: Goesling--------	0-4	Loamy sand-------	SM	A-2	0	100	100	75-90	20-30	---	NP
	4-30	Sandy clay loam, clay loam.	CL-ML, SM-SC, SC, CL	A-4, A-6	0	100	100	65-80	40-55	25-30	5-15
	30-64	Sandy loam, sandy clay loam.	SM-SC	A-2, A-4	0	100	100	40-55	20-40	25-30	5-10

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
411*:											
Celacy----------	0-2	Sandy loam-------	SM	A-2, A-4	0-5	95-100	90-100	60-70	30-40	20-25	NP-5
	2-21	Sandy clay loam, clay loam, loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0	95-100	90-100	65-75	40-55	25-35	5-15
	21-31	Fine sandy loam, sandy clay loam, loam.	SM-SC	A-4	0	85-95	80-90	55-70	35-50	20-30	5-10
	31	Weathered bedrock	---	---	---	---	---	---	---	---	---
422*:											
Pietown---------	0-10	Fine sandy loam	SM, SM-SC	A-4	0	95-100	95-100	65-80	40-50	20-30	NP-10
	10-60	Stratified sand to clay.	SM	A-2, A-4	0	90-100	75-100	50-100	25-40	20-25	NP-5
Hickman---------	0-1	Very fine sandy loam.	CL-ML	A-4	0	80-100	75-100	60-75	50-65	25-30	5-10
	1-60	Stratified sandy loam to clay loam.	CL-ML, CL	A-4, A-6	0	80-100	75-100	60-75	50-65	25-35	5-15
424-------------- Manzano	0-3	Clay loam--------	CL	A-6	0	100	100	90-100	75-85	30-40	10-15
	3-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0	80-100	75-100	70-100	50-85	25-40	5-15
425*:											
Catman----------	0-3	Clay-------------	CL	A-6	0	100	100	85-100	70-85	30-40	10-20
	3-60	Clay loam, clay, silty clay loam.	CL, CH	A-6, A-7	0	100	100	75-85	70-80	35-55	15-40
Hickman---------	0-4	Clay loam--------	CL-ML	A-4	0	80-100	75-100	60-75	50-65	25-30	5-10
	4-60	Stratified sandy loam to clay loam.	CL-ML, CL	A-4, A-6	0	80-100	75-100	60-75	50-65	25-35	5-15
459-------------- Telescope	0-4	Loamy fine sand	SM	A-2	0	100	95-100	50-75	20-35	15-20	NP-5
	4-17	Fine sandy loam, sandy loam.	SM-SC, SM	A-2, A-4	0	80-95	75-90	50-75	25-40	15-25	NP-10
	17-60	Fine sandy loam, gravelly fine sandy loam.	SM-SC, SM	A-2, A-4	0	65-95	60-90	45-75	25-50	15-25	NP-10
463*:											
Datil-----------	0-2	Gravelly loam----	GM, SM, GM-GC, SM-SC	A-1, A-2, A-4	0-5	60-80	55-75	40-60	20-40	15-25	NP-10
	2-25	Gravelly clay loam, clay loam, sandy clay loam.	SM-SC, SC	A-4, A-6	0-10	70-85	65-80	50-60	35-50	25-35	5-15
	25-60	Gravelly loam, gravelly sandy clay loam, gravelly sandy loam.	SM-SC, GM-GC	A-2, A-4	0-5	65-75	60-70	50-65	30-45	25-30	5-10
Dioxice---------	0-2	Gravelly loam----	CL-ML, SM-SC, GM-GC	A-4	0	60-80	55-75	50-65	45-60	25-30	5-10
	2-7	Loam-------------	CL-ML	A-4	0	100	90-100	75-90	55-70	25-30	5-10
	7-25	Gravelly loam----	CL-ML, SM-SC, GM-GC	A-4	0	65-80	60-75	50-65	45-60	25-30	5-10
	25-60	Gravelly sandy loam, very gravelly sandy loam.	CL-ML, GM-GC	A-4	10-15	60-75	55-70	50-65	40-55	25-30	5-10

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
471*:											
Faraway----------	0-8	Very stony loam	GM, SM	A-4	50-60	65-80	60-75	50-70	35-50	20-25	NP-5
	8-12	Very stony loam, very cobbly loam.	GM, SM	A-4	50-60	65-80	60-75	50-70	35-50	20-25	NP-5
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Motoqua----------	0-4	Very cobbly loam	GM-GC, GC	A-2, A-4	30-50	50-65	50-65	40-50	30-40	20-30	NP-10
	4-12	Very cobbly silt loam, extremely cobbly loam.	GM-GC, GC	A-4, A-6	30-50	45-65	40-60	40-60	35-40	25-35	5-15
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
472*:											
Abrazo-----------	0-9	Gravelly loam----	SM-SC, GM-GC	A-4	5-10	65-80	60-75	45-65	35-50	25-30	5-10
	9-33	Cobbly clay loam, cobbly sandy clay, cobbly clay.	CL	A-6, A-7	20-30	75-95	70-90	60-85	50-75	35-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
479-------------- Augustine	0-3	Fine sandy loam	SM	A-4	0	80-95	75-90	55-75	35-50	20-25	NP-5
	3-24	Clay loam, loam	CL-ML, CL	A-4, A-6	0	80-95	75-90	70-85	50-65	25-40	5-15
	24-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0	80-95	75-90	70-85	50-65	25-40	5-15
482*:											
Datil------------	0-4	Sandy loam-------	SM	A-2, A-4	0	80-90	75-85	50-70	25-45	15-20	NP-5
	4-12	Loam, sandy clay loam.	SM-SC, CL-ML	A-4	0-5	95-100	90-100	70-85	40-55	25-30	5-10
	12-60	Gravelly loam, gravelly sandy clay loam, gravelly sandy loam.	SM-SC, GM-GC	A-2, A-4	0-5	65-75	60-70	50-65	30-45	25-30	5-10
Guy--------------	0-3	Gravelly sandy loam.	GM, SM	A-1, A-2, A-4	0-10	60-95	55-75	35-50	20-40	15-25	NP-5
	3-10	Gravelly sandy loam.	GM, SM	A-1, A-2, A-4	0-10	60-95	55-75	35-50	20-40	15-25	NP-5
	10-60	Gravelly sandy loam, gravelly loam.	GM, SM	A-2, A-4	10-15	65-90	60-85	40-60	30-45	15-25	NP-5
486*:											
Valnor-----------	0-6	Fine sandy loam	SM-SC	A-4	0	90-100	75-100	70-80	40-50	25-30	5-10
	6-12	Sandy clay loam	CL, SC	A-6	0	90-100	75-100	55-65	45-55	30-40	10-20
	12-31	Clay, clay loam, sandy clay.	CL, CH	A-7	0	100	75-100	75-85	60-80	40-55	20-30
	31-36	Clay loam, clay, silty clay.	CL, CH	A-7	0	100	75-100	70-95	65-85	40-55	20-30
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
Midnight---------	0-3	Very gravelly loam.	GM-GC	A-2	15-25	40-60	35-60	25-40	15-25	25-30	5-10
	3-7	Very cobbly clay loam, very cobbly loam.	GM-GC, SM-SC	A-2, A-4	30-40	65-75	60-70	40-55	30-40	25-30	5-10
	7	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
487*:											
Ustic Torriorthents.											
Rock outcrop.											
Badland.											
492*:											
Jacee-----------	0-7	Loam-------------	CL-ML	A-4	0	95-100	90-100	75-90	55-70	25-30	5-10
	7-29	Clay, clay loam, silty clay.	CL	A-7	0	90-100	85-100	75-95	65-85	40-50	15-25
	29	Weathered bedrock	---	---	---	---	---	---	---	---	---
Celacy----------	0-8	Fine sandy loam	SM	A-2, A-4	0-5	95-100	90-100	60-70	30-40	20-25	NP-5
	8-22	Sandy clay loam, clay loam, loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0	95-100	90-100	65-75	40-55	25-35	5-15
	22-28	Fine sandy loam, sandy clay loam, loam.	SM-SC	A-4	0	85-95	80-90	55-70	35-50	20-30	5-10
	28	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
493*:											
Mion------------	0-2	Gravelly clay loam.	GC, SC	A-2, A-6	0	55-80	50-75	40-50	30-40	30-40	10-15
	2-16	Clay, clay loam	CL, CH	A-7	0	100	100	90-100	75-95	45-55	20-30
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
Travessilla-----	0-3	Very gravelly sandy loam.	GM, SM, GP-GM, SP-SM	A-1, A-2	15-30	40-65	35-60	25-40	5-30	20-25	NP-5
	3-13	Cobbly sandy loam	SM	A-2, A-4	10-25	70-90	65-85	40-65	25-40	20-25	NP-5
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
494-------------- Catman	0-10	Silty clay-------	CL, CH	A-7	0	100	100	90-100	80-90	40-55	20-40
	10-60	Silty clay, clay, silty clay loam.	CL, CH	A-6, A-7	0	100	100	75-85	70-80	35-55	15-40
495*:											
Mion------------	0-3	Gravelly clay loam.	GC, SC	A-2, A-6	0	55-80	50-75	40-50	30-40	30-40	10-15
	3-20	Clay, silty clay	CL, CH	A-7	0	100	100	90-100	75-95	45-55	20-30
	20	Weathered bedrock	---	---	---	---	---	---	---	---	---
Catman----------	0-3	Clay loam--------	CL	A-6	0	100	100	80-95	65-80	30-40	10-20
	3-60	Silty clay, clay, silty clay loam.	CL, CH	A-6, A-7	0	100	100	75-85	70-80	35-55	15-40
497-------------- Royosa	0-4	Fine sand--------	SP-SM, SM	A-2, A-3	0	100	100	70-80	5-25	---	NP
	4-60	Loamy sand, fine sand, sand.	SP-SM, SM	A-2, A-3	0	100	100	50-80	5-35	---	NP
517*:											
Loarc-----------	0-4	Loamy sand-------	SM	A-2	0	100	95-100	60-70	20-30	---	NP
	4-25	Sandy clay loam, sandy loam, gravelly sandy clay loam.	SM, SM-SC, ML, CL-ML	A-4	0	75-90	70-85	60-75	35-55	25-35	5-10
	25-60	Sandy loam-------	SM	A-4	0	80-100	75-100	50-70	35-50	20-25	NP-5

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
517*:											
Telescope-------	0-2	Loamy sand-------	SM	A-2	0	100	95-100	50-75	20-35	15-20	NP-5
	2-60	Fine sandy loam, sandy loam.	SM	A-2, A-4	0	80-95	75-90	50-75	25-40	15-20	NP-5
525-------------- Telescope	0-3	Loamy sand-------	SM	A-2	0	100	95-100	50-75	20-35	15-20	NP-5
	3-23	Fine sandy loam, sandy loam.	SM	A-2, A-4	0	80-95	75-90	50-75	25-40	15-20	NP-5
	23-60	Loamy sand, gravelly loamy fine sand.	SM	A-1, A-2	0	65-95	60-90	35-60	10-25	15-20	NP-5
540-------------- Goldust	0-7	Gravelly sandy clay loam.	GM-GC, SM-SC	A-2, A-4	0-15	65-80	60-75	40-55	30-40	25-30	5-10
	7-27	Very gravelly clay loam, very gravelly clay.	GC	A-2	15-25	40-65	35-60	30-45	20-35	40-55	15-35
	27-60	Very cobbly sandy loam, extremely gravelly sandy loam.	GM	A-1	15-40	30-55	25-50	15-30	5-20	20-30	NP-5
550-------------- Bario	0-3	Sandy clay loam	SM	A-4	0	80-95	75-90	55-70	35-50	30-35	5-10
	3-27	Clay loam, sandy clay, clay.	CL, CH	A-7	0	80-95	75-90	60-75	50-65	40-60	15-40
	27-60	Clay loam, clay	CL, CH	A-7	0	80-95	75-90	70-80	60-75	40-60	15-40
551-------------- Pleioville	0-2	Gravelly sandy loam.	SM	A-4, A-2	0	65-80	60-75	40-60	25-40	20-25	NP-5
	2-12	Gravelly clay, gravelly clay loam.	CL, GC, SC	A-6, A-7	0	55-80	50-75	40-65	35-55	35-50	15-25
	12-24	Very gravelly clay, very gravelly clay loam.	GC	A-2	0	40-55	35-50	30-45	20-35	40-55	15-30
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
555*:											
Motoqua---------	0-3	Very gravelly loam.	GM-GC, GM	A-1, A-2	10-15	35-60	30-55	25-40	20-30	20-30	NP-10
	3-10	Very gravelly sandy clay loam, very cobbly clay loam.	GM-GC, GC	A-2, A-4, A-6	15-45	35-55	30-50	25-45	20-40	25-35	5-15
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
560-------------- Maia	0-5	Sandy loam-------	SM	A-4	0	90-100	85-100	50-60	40-50	20-25	NP-5
	5-10	Sandy clay loam, clay loam.	CL	A-6	0	90-100	85-100	60-70	50-60	30-35	10-15
	10-23	Clay loam, gravelly sandy clay loam, gravelly clay loam.	GC, SC	A-6	0	60-80	55-80	50-60	40-50	30-35	10-15
	23-60	Gravelly loam, gravelly sandy loam, gravelly fine sandy loam.	GM-GC, SM-SC	A-2, A-4	0	60-80	55-75	45-55	25-40	25-30	5-10

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
565--------------	0-3	Loam-------------	CL-ML	A-4	0-5	95-100	90-100	80-95	65-80	25-30	5-10
Celsosprings	3-13	Clay loam, clay.	CL	A-7	0-10	95-100	90-100	85-95	70-85	40-50	15-25
	13-26	Cobbly clay loam, gravelly clay.	CL	A-7	10-25	70-90	65-85	60-75	50-65	40-50	15-25
	26-33	Gravelly clay loam, cobbly clay.	CL	A-7	10-25	70-90	65-85	60-80	60-75	40-50	15-25
	33-60	Gravelly clay loam, loam, gravelly loam.	CL-ML, SM-SC, GM-GC, CL	A-6, A-4	0-10	70-90	65-85	55-65	45-60	25-40	5-15
575*:											
Joachem---------	0-3	Gravelly sandy loam.	SM	A-1, A-2	10-15	75-85	65-80	40-60	20-35	20-25	NP-5
	3-8	Cobbly sandy loam, cobbly loam, gravelly sandy loam.	SM	A-2, A-4	10-25	75-95	65-85	40-55	30-45	20-25	NP-5
	8-11	Very cobbly loam, cobbly loam, gravelly sandy loam.	SM	A-2, A-4	10-30	65-80	60-75	40-60	25-45	---	NP
	11	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
580*:											
Loarc-----------	0-3	Sandy loam-------	SM	A-4	0	100	95-100	75-90	35-50	20-25	NP-5
	3-60	Sandy clay loam, sandy loam, gravelly sandy clay loam.	SM, SM-SC, ML, CL-ML	A-4	0	75-90	70-85	60-75	35-55	25-35	5-10
Datil-----------	0-2	Cobbly loam------	CL-ML	A-4	15-25	85-95	80-90	65-80	55-75	25-30	5-10
	2-18	Gravelly clay loam, clay loam, sandy clay loam.	SM-SC, SC	A-4, A-6	0-5	70-80	65-80	50-60	35-50	25-35	5-15
	18-60	Loam, sandy clay loam, sandy loam.	SM-SC, CL-ML	A-4	0-5	95-100	90-100	70-85	40-55	25-30	5-10
585*:											
Abrazo----------	0-7	Loam-------------	ML	A-4	0	80-100	75-100	65-75	50-60	20-25	NP-5
	7-36	Clay, clay loam, gravelly clay loam.	CL, CH	A-7	0	80-100	70-100	65-90	55-75	40-60	15-35
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Apache----------	0-3	Gravelly sandy loam.	SM	A-2, A-4	10-15	65-90	60-85	45-55	25-40	20-25	NP-5
	3-10	Loam-------------	CL-ML	A-4	0-5	95-100	90-100	75-90	60-75	25-30	5-10
	10-14	Gravelly sandy loam.	GM, SM	A-2, A-4	10-15	65-90	60-85	45-55	30-40	20-25	NP-5
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
590*:											
Penistaja-------	0-3	Sandy loam-------	ML, SM	A-4	0	100	100	90-100	40-60	20-25	NP-5
	3-25	Sandy clay loam, clay loam.	CL-ML, CL, SC, SM-SC	A-4, A-6	0	100	100	95-100	45-75	25-35	5-15
	25-60	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	70-95	30-55	20-30	NP-10

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
590*:											
Viuda----------	0-2	Gravelly sandy loam.	SM, GM	A-1, A-2	0-10	60-80	55-75	35-50	20-35	20-25	NP-5
	2-8	Gravelly clay, gravelly sandy clay, gravelly clay loam.	GC, SC, CL	A-7	0-10	65-80	60-75	55-70	45-60	40-50	15-25
	8-15	Gravelly clay loam, gravelly sandy clay loam, cobbly sandy clay loam.	ML, SM	A-6	10-25	75-90	70-85	50-60	40-55	35-40	10-15
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
592*:											
Celacy----------	0-5	Loamy sand--------	SM	A-1, A-2	0-5	95-100	90-100	45-60	15-30	---	NP
	5-16	Sandy clay loam, clay loam, loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0	95-100	90-100	65-75	40-55	25-35	5-15
	16-22	Sandy loam, sandy clay loam, loam.	SM-SC	A-4	0	85-95	80-90	55-70	35-50	20-30	5-10
	22	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
595*:											
Amenson---------	0-4	Loam-------------	ML, CL-ML	A-4	0	95-100	95-100	70-85	55-70	20-30	NP-10
	4-18	Gravelly loam, loam, sandy loam.	SM, SM-SC	A-2, A-4	0-5	95-100	70-85	50-70	25-50	20-30	NP-10
	18	Indurated--------	---	---	---	---	---	---	---	---	---
Gustspring------	0-3	Loam-------------	CL-ML	A-4	0-5	90-95	85-90	65-80	55-70	25-30	5-10
	3-19	Gravelly sandy clay loam, gravelly clay loam, gravelly loam.	GM-GC, GC, SM-SC, CL	A-4, A-6	10-15	65-90	60-85	50-65	40-55	25-35	5-15
	19-31	Gravelly loamy coarse sand, gravelly sandy loam.	SM	A-1	10-15	65-70	60-65	35-45	10-25	20-25	NP-5
	31-60	Extremely gravelly loamy coarse sand, very gravelly coarse sand.	GP, SP, GP-GM, SP-SM	A-1	15-30	30-65	25-60	10-25	0-10	---	NP
606*:											
Tolman----------	0-2	Extremely cobbly loam.	CL-ML, CL	A-4	65-70	60-75	55-70	50-65	50-60	20-30	5-10
	2-9	Very cobbly clay loam, extremely cobbly loam.	GC	A-6, A-2	30-55	40-65	35-60	30-55	25-40	20-30	10-15
	9	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
612*:											
Typic Argiborolls.											

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
612*:											
Tolman	0-3	Extremely cobbly loam.	CL-ML	A-4	65-70	60-75	55-70	50-65	50-60	20-30	5-10
	3-13	Extremely cobbly clay loam.	GC	A-6, A-2	45-50	40-50	35-45	30-45	25-40	25-30	10-15
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Motoqua	0-2	Extremely cobbly loam.	GM-GC, GC	A-2, A-4	55-60	45-55	40-50	40-50	30-40	20-30	NP-10
	2-14	Very cobbly clay loam, very cobbly loam.	GM-GC, GC	A-4, A-6	25-45	55-65	55-65	50-55	35-40	25-35	5-15
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
624	0-4	Loam	CL-ML	A-4	0	100	100	85-95	60-75	25-30	5-10
Brycan	4-60	Clay loam, loam	CL-ML	A-4	0	100	100	85-100	60-80	25-30	5-10
625*:											
Coni	0-1	Very gravelly sandy loam.	GM	A-1, A-2	10-15	35-60	30-55	20-35	15-30	20-30	NP-5
	1-15	Clay loam, gravelly clay loam, loam.	CL	A-6	0-10	80-90	75-85	60-75	50-65	25-35	10-15
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tolman	0-4	Cobbly loam	CL-ML	A-4	20-35	85-95	85-95	75-90	50-70	20-30	5-10
	4-18	Very cobbly clay loam, very cobbly loam.	GC	A-6, A-2	30-40	50-60	40-50	30-40	25-40	20-30	10-15
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
635*:											
Jacee	0-2	Loam	CL-ML	A-4	0	95-100	90-100	75-90	55-70	25-30	5-10
	2-24	Clay, clay loam, silty clay.	CL	A-7	0	90-100	85-100	75-95	65-85	40-50	15-25
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Mion	0-3	Loam	CL-ML	A-4	0	100	100	80-90	70-85	25-30	5-10
	3-18	Silty clay, clay, clay loam.	CL, CH	A-7	0	100	100	90-100	75-95	45-55	20-30
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
Celacy	0-3	Loam	ML, CL-ML	A-4	0-5	95-100	90-100	70-80	55-65	25-30	NP-10
	3-12	Sandy clay loam, clay loam, loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0	95-100	90-100	65-75	40-55	25-35	5-15
	12-22	Fine sandy loam, sandy clay loam, loam.	SM-SC	A-4	0	85-95	80-90	55-70	35-50	20-30	5-10
	22	Weathered bedrock	---	---	---	---	---	---	---	---	---
645*:											
Albinas	0-2	Sandy loam	SM	A-4	0	100	95-100	70-80	40-50	20-25	NP-5
	2-45	Sandy clay loam, clay loam, loam.	SC, CL	A-6	0	100	95-100	80-100	40-80	30-40	10-20
	45-63	Loam	CL-ML, ML	A-4	0	100	95-100	60-95	50-75	20-35	5-10
Datil	0-4	Loam	CL-ML	A-4	0	80-90	75-85	65-80	50-65	25-30	5-10
	4-22	Gravelly clay loam, clay loam, sandy clay loam.	SM-SC, SC	A-4, A-6	0-5	70-80	65-75	50-60	35-50	25-35	5-15
	22-60	Gravelly loam, gravelly sandy clay loam, gravelly sandy loam.	SM-SC, GM-GC	A-2, A-4	0-5	65-75	60-70	50-65	30-45	25-30	5-10

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
650*: Typic Ustorthents.											
Hickman---------	0-3	Loam-------------	CL-ML	A-4	0	80-100	75-100	60-75	50-65	25-30	5-10
	3-60	Stratified sandy loam to clay loam.	CL-ML, CL	A-4, A-6	0	80-100	75-100	60-75	50-65	25-35	5-15
Majada----------	0-3	Very cobbly sandy loam.	SM	A-2, A-4	50-55	75-95	70-90	50-60	30-40	20-25	NP-5
	3-17	Very cobbly sandy clay loam, very cobbly clay loam.	SC, CL	A-6	50-55	75-95	70-90	55-75	45-60	30-35	10-15
	17-60	Very cobbly loam, extremely stony loam.	GM-GC, SM-SC	A-2, A-4	50-60	50-80	45-75	35-60	30-50	25-30	5-10
655*:											
Majada----------	0-3	Very cobbly loam	CL-ML	A-4	50-55	75-95	70-90	60-75	50-65	25-30	5-10
	3-21	Very cobbly loam, very cobbly clay loam.	SC, CL	A-6	50-55	75-95	70-90	55-75	45-60	30-35	10-15
	21-60	Very cobbly loam, extremely cobbly loam.	GM-GC, SM-SC	A-2, A-4	50-60	50-80	45-75	35-60	30-50	25-30	5-10
Lapdun----------	0-2	Very cobbly loam	CL-ML, GM-GC	A-4	30-45	65-80	55-70	45-60	40-55	25-30	5-10
	2-36	Very cobbly clay loam, very cobbly loam.	GC, SC	A-2	25-45	50-70	45-65	35-45	25-35	25-35	10-15
	36-60	Very cobbly loamy sand.	SP-SM, SM	A-1	30-55	55-75	50-70	30-45	5-25	---	NP
660*:											
Datil-----------	0-2	Sandy loam-------	SM	A-2, A-4	0	80-90	75-85	50-70	25-45	15-20	NP-5
	2-60	Loam, sandy clay loam.	SM-SC, CL-ML	A-4	0-5	95-100	90-100	70-85	40-55	25-30	5-10
Loarc-----------	0-3	Sandy loam-------	SM	A-4	0	100	95-100	75-90	35-50	20-25	NP-5
	3-19	Sandy clay loam, sandy loam, gravelly sandy clay loam.	SM, SM-SC, ML, CL-ML	A-4	0	75-90	70-85	60-75	35-55	25-35	5-10
	19-60	Gravelly sandy loam, sandy loam, loamy sand.	SM	A-2, A-4	0	65-80	60-75	30-55	25-40	20-25	NP-5
665*:											
Veteado---------	0-6	Sandy loam-------	SM	A-4	0	100	85-100	45-65	35-50	25-30	NP-5
	6-16	Clay, sandy clay	CL, CH	A-7	0	100	95-100	85-95	65-75	40-60	15-35
	16-28	Sandy clay loam, clay loam.	CL	A-6	0	100	90-100	65-80	50-70	30-35	10-15
	28-60	Sandy clay loam	SM-SC	A-4, A-2	0	100	85-100	60-80	30-40	25-30	5-10
Penistaja-------	0-5	Sandy loam-------	ML, SM	A-4	0	100	100	90-100	40-60	20-25	NP-5
	5-20	Sandy clay loam, clay loam.	CL-ML, CL, SC, SM-SC	A-4, A-6	0	100	100	95-100	45-75	25-35	5-15
	20-60	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	70-95	30-55	20-30	NP-10

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
670*:											
Diatee----------	0-2	Gravelly sandy loam.	SM	A-2, A-4	0-15	70-85	65-80	45-60	30-40	20-25	NP-5
	2-14	Gravelly sandy clay loam, gravelly clay loam.	GC, GM-GC, CL, CL-ML	A-4, A-6	0-10	65-80	60-75	50-70	40-60	25-35	5-15
	14-18	Very gravelly sandy clay loam, very gravelly sandy loam.	GM-GC	A-2	10-15	45-60	40-55	25-40	15-30	25-30	5-10
	18-60	Very gravelly coarse sand, very gravelly loamy coarse sand.	GP-GM, GM	A-1	0-15	35-55	30-50	20-35	5-20	---	NP
Flugle----------	0-4	Loam-------------	ML, CL-ML	A-4	0	100	90-100	65-80	55-65	20-25	NP-10
	4-25	Sandy clay loam, clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	90-100	60-80	40-60	25-35	5-15
	25-60	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	90-100	50-60	30-40	20-25	NP-5
671*:											
Smilo-----------	0-5	Stony loam-------	CL-ML	A-4	15-30	75-95	70-90	60-75	50-65	25-30	5-10
	5-25	Cobbly clay loam, cobbly clay.	CL, CH	A-7	15-30	75-95	70-90	70-80	65-75	40-55	20-40
	25-30	Gravelly clay, cobbly clay, gravelly clay loam.	CL, CH	A-7	10-25	70-90	65-85	60-75	50-70	40-55	20-40
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Adman-----------	0-3	Stony loam-------	ML, CL-ML	A-4	20-30	85-95	80-90	75-90	65-80	25-35	5-10
	3-19	Gravelly clay, cobbly clay, cobbly clay loam.	CH	A-7	10-25	70-90	65-85	65-85	60-80	50-60	25-35
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
675*:											
Loarc-----------	0-2	Sandy loam-------	SM	A-4	0	100	95-100	75-90	35-50	20-25	NP-5
	2-23	Sandy clay loam, sandy loam, gravelly sandy clay loam.	SM, SM-SC, ML, CL-ML	A-4	0	75-90	70-85	60-75	35-55	25-35	5-10
	23-60	Sandy loam-------	SM	A-4	0	80-100	75-100	50-70	35-50	20-25	NP-5
Flugle----------	0-3	Sandy loam-------	SM	A-2, A-4	0	100	90-100	50-60	30-40	20-25	NP-5
	3-29	Sandy clay loam, clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	90-100	60-80	40-60	25-35	5-15
	29-60	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	90-100	50-60	30-40	20-25	NP-5
Manzano---------	0-2	Loam-------------	CL-ML	A-4	0	90-100	90-100	85-100	60-80	20-30	5-10
	2-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0	80-100	75-100	70-100	50-85	25-40	5-15
680------------- Jacques	0-5	Clay loam--------	ML	A-6, A-7	0	100	100	90-100	70-80	35-45	10-15
	5-60	Clay, silty clay loam.	CL	A-7	0	100	100	90-100	70-90	40-50	15-25
690*:											
Millpaw---------	0-4	Loam-------------	CL-ML	A-4	0	100	100	80-90	65-75	25-30	5-10
	4-35	Clay loam, clay	CL, CH	A-6, A-7	0	100	100	85-95	75-90	35-55	15-30
	35-60	Sandy clay loam, clay loam, loam.	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-90	50-70	25-35	5-15

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
690*:											
Datil-----------	0-3	Fine sandy loam	SM	A-2, A-4	0	80-90	75-85	50-70	25-45	15-20	NP-5
	3-60	Gravelly clay loam, gravelly sandy clay loam, loam.	SM-SC, CL-ML	A-4	0-10	80-90	75-85	70-85	40-55	25-30	5-10
700*:											
Hiarc-----------	0-7	Sandy loam-------	SM	A-4	0	95-100	90-100	60-95	35-50	20-25	NP-5
	7-19	Sandy clay loam, loam.	CL-ML	A-4	0	80-95	75-90	60-70	50-65	25-30	5-10
	19-25	Gravelly sandy clay loam, sandy loam, gravelly sandy loam.	SM-SC	A-2, A-4	5-10	65-95	60-90	40-60	25-50	25-30	5-10
	25	Weathered bedrock	---	---	---	---	---	---	---	---	---
Loarc-----------	0-2	Fine sandy loam	SM	A-4	0	100	95-100	75-90	35-50	20-25	NP-5
	2-14	Sandy clay loam, sandy loam, gravelly sandy clay loam.	SM, SM-SC, ML, CL-ML	A-4	0	75-90	70-85	60-75	35-55	25-35	5-10
	14-60	Sandy loam-------	SM	A-4	0	80-100	75-100	50-70	35-50	20-25	NP-5
Typic Ustorthents.											
705*:											
Parquat---------	0-2	Very cobbly sandy loam.	GM, SM	A-1, A-2	30-55	55-75	50-70	40-55	20-35	20-25	NP-5
	2-12	Very gravelly clay loam.	GC	A-2	15-25	40-65	35-60	30-45	25-35	35-40	15-20
	12-19	Very cobbly clay loam, very cobbly clay.	GC, SC	A-2, A-6	30-55	55-75	50-70	40-55	30-40	35-40	15-20
	19-33	Cobbly sandy loam, very cobbly sandy loam.	GM, SM	A-1, A-2	15-30	55-70	50-65	35-40	20-30	20-25	NP-5
	33-60	Very cobbly loamy coarse sand, very cobbly sandy loam.	SM	A-1, A-2	30-55	55-75	50-70	20-35	5-30	20-25	NP-5
Tafoya----------	0-3	Stony loam------	CL-ML	A-4	15-30	85-95	80-90	65-80	55-70	25-30	5-10
	3-25	Very gravelly clay loam.	GC	A-2	15-30	40-65	35-60	30-45	20-35	35-40	15-20
	25-60	Very gravelly sandy clay loam.	GM-GC, GC	A-2	15-30	40-65	35-60	25-35	20-30	25-35	5-15
710*:											
Alegros---------	0-2	Cobbly loam------	SM-SC	A-4	15-25	70-95	65-90	50-65	35-50	25-30	5-10
	2-21	Gravelly clay loam, gravelly clay.	CL, CH	A-6, A-7	5-10	65-85	60-80	55-70	50-65	35-60	15-40
	21-52	Extremely gravelly coarse sandy loam, extremely gravelly loamy sand.	GM, GP-GM	A-1	25-40	15-55	10-50	5-15	5-15	---	NP
	52-60	Extremely gravelly loamy coarse sand.	GP-GM	A-1	25-30	15-40	10-35	5-10	5-10	---	NP

See footnote at end of table.

TABLE 9.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
710*:											
Alegros Variant-	0-2	Extremely cobbly loam.	GM, GM-GC	A-2	60-70	45-60	40-55	30-45	20-35	25-35	5-10
	2-11	Very cobbly clay loam, very cobbly clay.	GC, SC	A-7	30-55	55-75	50-70	45-65	35-50	40-50	15-25
	11-19	Gravelly clay, gravelly clay loam.	CL, CH	A-7	10-15	65-90	60-85	55-70	50-65	40-55	15-30
	19-60	Cobbly sandy loam, cobbly loamy sand.	SM	A-2, A-4	15-30	75-95	70-90	50-75	20-45	20-25	NP-5
715-------------- Guy	0-3	Gravelly loamy fine sand.	SM	A-1, A-2	0-10	60-80	55-75	40-60	10-30	15-20	NP-5
	3-12	Gravelly fine sandy loam.	GM, SM	A-1, A-2, A-4	0-10	60-80	55-75	35-50	20-40	15-25	NP-5
	12-60	Gravelly fine sandy loam, gravelly loam.	GM, SM	A-2, A-4	10-15	65-90	60-85	40-60	30-45	15-25	NP-5
720-------------- Gustspring	0-3	Gravelly fine sandy loam.	GM, SM	A-2, A-4	0-10	60-80	55-75	40-60	30-50	20-30	NP-5
	3-17	Sandy clay loam, gravelly sandy clay loam, clay loam.	SC	A-2, A-6	0-10	80-95	75-90	50-65	25-40	25-35	10-15
	17-21	Gravelly sandy loam.	GM, SM	A-2, A-4	0-10	60-80	55-75	45-65	30-50	20-30	NP-5
	21-60	Extremely gravelly loamy coarse sand.	GP-GM	A-1	15-25	25-35	20-30	10-20	5-10	---	NP

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
330*:										
Tejana----------	0-4	18-25	2.0-6.0	0.08-0.10	7.4-7.8	<2	Low----------	0.10	4	8
	4-24	20-35	0.6-2.0	0.12-0.14	7.4-8.4	<2	Moderate-----	0.20		
	24-60	25-35	0.6-2.0	0.14-0.16	7.9-9.0	<2	Moderate-----	0.32		
Rock outcrop.										
335*:										
Ralphston-------	0-2	12-17	0.6-2.0	0.15-0.17	7.9-8.4	<2	Low----------	0.37	5	4L
	2-13	18-25	0.6-2.0	0.14-0.16	7.9-8.4	<2	Low----------	0.37		
	13-60	18-35	0.6-2.0	0.16-0.18	7.9-9.0	<2	Moderate-----	0.37		
Amenson---------	0-3	20-27	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low----------	0.37	1	4L
	3-15	25-35	0.2-0.6	0.16-0.18	7.4-9.0	<2	Moderate-----	0.32		
	15	---	---	---	---	---	-------------	----		
340*:										
Flugle----------	0-3	10-17	2.0-6.0	0.13-0.15	6.6-7.3	<2	Low----------	0.24	5	3
	3-22	20-35	0.6-2.0	0.16-0.18	6.6-8.4	<2	Moderate-----	0.37		
	22-60	10-20	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low----------	0.24		
Typic Ustorthents.										
341*:										
Flugle----------	0-1	10-20	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low----------	0.24	5	3
	1-21	20-35	0.6-2.0	0.16-0.18	6.6-8.4	<2	Moderate-----	0.37		
	21-60	10-20	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low----------	0.24		
Jacques---------	0-2	30-40	0.2-0.6	0.19-0.21	6.6-7.8	<2	Moderate-----	0.32	5	6
	2-60	35-45	0.06-0.2	0.14-0.17	6.6-8.4	<2	High---------	0.24		
347*:										
Datil-----------	0-4	9-17	2.0-6.0	0.12-0.14	7.4-7.8	<2	Low----------	0.28	5	3
	4-20	20-35	0.6-2.0	0.15-0.18	7.4-7.8	<2	Moderate-----	0.32		
	20-60	15-25	0.6-2.0	0.09-0.11	7.4-8.4	<2	Low----------	0.20		
Dioxice---------	0-4	15-20	2.0-6.0	0.08-0.10	7.4-8.4	<2	Low----------	0.15	4	4
	4-14	20-27	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low----------	0.20		
	14-60	18-25	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low----------	0.20		
365*:										
Cabezon---------	0-4	28-35	0.2-0.6	0.16-0.18	6.1-7.3	<2	Moderate-----	0.15	1	7
	4-19	35-50	0.06-0.2	0.12-0.14	6.1-7.3	<2	High---------	0.28		
	19	---	---	---	---	---	-------------	----		
Thunderbird-----	0-5	20-27	0.6-2.0	0.15-0.17	6.6-7.8	<2	Low----------	0.37	2	6
	5-23	35-55	<0.06	0.14-0.16	6.6-7.8	<2	High---------	0.28		
	23	---	---	---	---	---	-------------	----		
Celsosprings----	0-4	20-27	0.6-2.0	0.17-0.20	6.1-6.5	<2	Low----------	0.43	5	6
	4-32	35-45	0.06-0.2	0.16-0.18	6.6-8.4	<2	High---------	0.32		
	32-60	20-35	0.6-2.0	0.16-0.18	7.4-8.4	<2	Moderate-----	0.24		
366-------------- Celsosprings	0-4	15-27	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low----------	0.20	5	7
	4-32	35-45	0.06-0.2	0.12-0.14	6.6-8.4	<2	High---------	0.15		
	32-60	25-35	0.2-0.6	0.17-0.19	7.4-8.4	<2	Moderate-----	0.32		
370*:										
Cabezon---------	0-4	18-27	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low----------	0.20	1	7
	4-10	35-50	0.06-0.2	0.12-0.14	6.1-7.3	<2	High---------	0.20		
	10	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 10.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
370*:										
Rock outcrop.										
371*:										
Smilo	0-2	10-17	2.0-6.0	0.08-0.10	5.6-6.5	<2	Low	0.15	4	4
	2-8	17-30	0.2-0.6	0.14-0.16	6.6-7.3	<2	Low	0.37		
	8-25	35-60	0.06-0.2	0.13-0.15	6.6-7.3	<2	High	0.15		
	25-32	35-60	0.06-0.2	0.13-0.15	6.6-7.3	<2	High	0.15		
	32	---	---	---	---	---	---	---		
Adman	0-2	22-27	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low	0.20	1	7
	2-15	35-55	0.06-0.2	0.12-0.14	6.6-7.3	<2	High	0.20		
	15	---	---	---	---	---	---	---		
373*:										
Gustspring	0-2	5-10	6.0-20	0.05-0.07	6.6-7.3	<2	Low	0.17	3	2
	2-11	18-35	0.6-2.0	0.08-0.10	6.6-8.4	<2	Moderate	0.20		
	11-22	10-18	2.0-6.0	0.05-0.07	7.9-9.0	<2	Low	0.15		
	22-60	5-10	6.0-20	0.02-0.04	7.4-8.4	<2	Low	0.05		
Guy	0-15	5-17	2.0-6.0	0.08-0.10	7.4-8.4	<2	Low	0.15	4	4
	15-60	5-17	2.0-6.0	0.10-0.12	7.4-8.4	<2	Low	0.20		
Typic Ustorthents.										
375*:										
Gustspring	0-2	10-15	2.0-6.0	0.06-0.08	6.6-7.3	<2	Low	0.10	3	5
	2-9	18-35	0.6-2.0	0.08-0.10	6.6-8.4	<2	Moderate	0.20		
	9-14	10-18	2.0-6.0	0.05-0.07	7.9-9.0	<2	Low	0.15		
	14-60	5-10	6.0-20	0.02-0.04	7.4-8.4	<2	Low	0.05		
Aridic Ustochrepts.										
382	0-3	9-20	2.0-6.0	0.09-0.11	7.4-7.8	<2	Low	0.15	5	4
Datil	3-22	20-35	0.6-2.0	0.15-0.18	7.4-7.8	<2	Moderate	0.32		
	22-60	15-25	0.6-2.0	0.09-0.11	7.4-8.4	<2	Low	0.20		
385*:										
Aridic Argiustolls.										
Rock outcrop.										
387*:										
Rock outcrop.										
Aridic Ustochrepts.										
390*:										
Rudd	0-8	20-27	0.6-2.0	0.12-0.14	7.4-8.4	<2	Low	0.20	1	5
	8-20	20-32	0.6-2.0	0.09-0.11	7.4-8.4	<2	Low	0.10		
	20	---	---	---	---	---	---	---		
Modyon	0-3	20-25	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low	0.20	1	5
	3-16	18-35	0.6-2.0	0.08-0.10	7.9-8.4	<2	Low	0.10		
	16-28	18-35	0.6-2.0	0.07-0.09	7.9-8.4	<2	Low	0.10		
	28	---	---	---	---	---	---	---		
408	0-4	5-12	2.0-6.0	0.06-0.08	7.9-8.4	2-4	Low	0.17	5	2
Hubbell	4-60	5-18	2.0-6.0	0.08-0.10	>9.0	2-4	Low	0.20		

See footnote at end of table.

TABLE 10.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
409*:										
Ceniza----------	0-6	12-18	2.0-6.0	0.05-0.07	7.4-7.8	<2	Low----------	0.05	2	6
	6-30	12-18	2.0-6.0	0.06-0.08	7.9-8.4	<2	Low----------	0.15		
	30-42	0-5	>20	0.03-0.05	7.9-8.4	<2	Low----------	0.02		
	42-60	20-30	0.6-2.0	0.14-0.16	7.9-9.0	<2	Low----------	0.32		
Gatlin----------	0-4	15-25	0.6-2.0	0.08-0.10	7.4-8.4	<2	Low----------	0.10	1	6
	4-10	20-30	0.6-2.0	0.09-0.11	7.4-9.0	<2	Low----------	0.10		
	10-60	5-10	>20	0.03-0.05	7.4-9.0	<2	Low----------	0.02		
411*:										
Goesling--------	0-4	5-15	6.0-20	0.06-0.08	6.6-7.8	<2	Low----------	0.17	5	2
	4-30	20-35	0.2-0.6	0.17-0.19	6.6-8.4	<2	Moderate-----	0.32		
	30-64	16-30	0.2-0.6	0.13-0.15	7.4-8.4	<2	Low----------	0.28		
Celacy----------	0-2	15-18	2.0-6.0	0.11-0.13	7.4-7.8	<2	Low----------	0.24	2	3
	2-21	18-35	0.6-2.0	0.16-0.18	7.4-7.8	<2	Moderate-----	0.37		
	21-31	18-30	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low----------	0.32		
	31	---	---	---	---	---	-------------	----		
422*:										
Pietown---------	0-10	10-20	2.0-6.0	0.13-0.15	7.4-8.4	<2	Low----------	0.28	5	3
	10-60	5-17	0.2-0.6	0.11-0.13	7.4-8.4	<2	Low----------	0.20		
Hickman---------	0-1	15-20	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low----------	0.55	5	3
	1-60	18-35	0.2-0.6	0.14-0.16	7.4-9.0	<2	Moderate-----	0.32		
424-------------- Manzano	0-3	28-35	0.2-0.6	0.19-0.21	6.6-7.8	<2	Moderate-----	0.32	5	6
	3-60	18-34	0.2-0.6	0.16-0.21	6.6-8.4	<2	Moderate-----	0.32		
425*:										
Catman----------	0-3	40-50	0.2-0.6	0.14-0.16	7.4-7.8	2-8	High---------	0.20	5	4
	3-60	35-60	<0.06	0.15-0.17	7.4-8.4	2-8	High---------	0.37		
Hickman---------	0-4	28-32	0.2-0.6	0.19-0.21	7.4-8.4	<2	Low----------	0.32	5	6
	4-60	18-35	0.2-0.6	0.14-0.16	7.4-9.0	<2	Moderate-----	0.32		
459-------------- Telescope	0-4	3-11	6.0-20	0.09-0.10	6.6-7.8	<2	Low----------	0.20	5	2
	4-17	5-15	6.0-20	0.12-0.14	7.4-7.8	<2	Low----------	0.28		
	17-60	5-15	6.0-20	0.11-0.13	7.9-8.4	<2	Low----------	0.28		
463*:										
Datil-----------	0-2	9-25	0.6-2.0	0.12-0.14	7.4-7.8	<2	Low----------	0.20	5	6
	2-25	20-35	0.6-2.0	0.15-0.18	7.4-7.8	<2	Moderate-----	0.32		
	25-60	15-25	0.6-2.0	0.09-0.11	7.4-8.4	<2	Low----------	0.20		
Dioxice---------	0-2	15-27	0.6-2.0	0.12-0.14	7.4-8.4	<2	Low----------	0.20	4	5
	2-7	20-27	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low----------	0.37		
	7-25	20-27	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low----------	0.20		
	25-60	18-20	0.6-2.0	0.08-0.10	7.9-8.4	<2	Low----------	0.15		
471*:										
Faraway---------	0-8	10-20	0.6-2.0	0.08-0.10	5.6-7.3	<2	Low----------	0.10	1	8
	8-12	10-20	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low----------	0.10		
	12	---	---	---	---	---	-------------	----		
Motoqua---------	0-4	10-18	0.6-2.0	0.08-0.10	6.6-7.3	<2	Low----------	0.10	1	7
	4-12	15-27	0.6-2.0	0.07-0.09	6.6-7.3	<2	Low----------	0.15		
	12	---	---	---	---	---	-------------	----		
Rock outcrop.										
472*:										
Abrazo----------	0-9	15-25	0.6-2.0	0.12-0.14	6.6-7.3	<2	Low----------	0.20	1	6
	9-33	35-45	0.06-0.2	0.12-0.14	6.6-7.8	<2	Moderate-----	0.15		
	33	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 10.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
472*:										
Rock outcrop.										
479	0-3	8-17	2.0-6.0	0.12-0.14	6.6-7.8	<2	Low	0.28	5	3
Augustine	3-24	18-35	0.2-0.6	0.16-0.18	7.4-8.4	<2	Moderate	0.32		
	24-60	18-35	0.6-2.0	0.13-0.15	7.9-8.4	<2	Moderate	0.32		
482*:										
Datil	0-4	9-17	2.0-6.0	0.12-0.14	7.4-7.8	<2	Low	0.24	5	3
	4-12	15-25	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low	0.32		
	12-60	15-25	0.6-2.0	0.09-0.11	7.4-8.4	<2	Low	0.20		
Guy	0-3	5-17	2.0-6.0	0.08-0.10	7.4-8.4	<2	Low	0.15	4	4
	3-10	5-17	2.0-6.0	0.08-0.10	7.4-8.4	<2	Low	0.15		
	10-60	5-17	2.0-6.0	0.10-0.12	7.4-8.4	<2	Low	0.20		
486*:										
Valnor	0-6	15-20	2.0-6.0	0.13-0.15	6.6-7.3	<2	Low	0.28	2	3
	6-12	20-35	0.6-2.0	0.15-0.17	6.6-7.3	<2	Moderate	0.32		
	12-31	35-45	0.06-0.2	0.14-0.16	6.6-7.8	<2	High	0.32		
	31-36	35-45	0.06-0.2	0.14-0.16	6.6-8.4	<2	High	0.32		
	36	---	---	---	---	---	---	---		
Midnight	0-3	20-27	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low	0.10	1	8
	3-7	20-30	0.6-2.0	0.09-0.11	6.6-7.8	<2	Low	0.10		
	7	---	---	---	---	---	---	---		
487*:										
Ustic Torriorthents.										
Rock outcrop.										
Badland.										
492*:										
Jacee	0-7	18-27	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low	0.37	2	6
	7-29	35-50	0.06-0.2	0.16-0.18	7.4-8.4	<2	High	0.28		
	29	---	---	---	---	---	---	---		
Celacy	0-8	15-18	2.0-6.0	0.13-0.15	7.4-7.8	<2	Low	0.28	2	3
	8-22	18-35	0.6-2.0	0.16-0.18	7.4-7.8	<2	Moderate	0.37		
	22-28	18-30	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low	0.32		
	28	---	---	---	---	---	---	---		
Rock outcrop.										
493*:										
Mion	0-2	30-35	0.2-0.6	0.14-0.16	6.6-8.4	<2	Moderate	0.15	1	7
	2-16	37-55	<0.06	0.15-0.17	6.6-8.4	<2	High	0.24		
	16	---	---	---	---	---	---	---		
Travessilla	0-3	10-18	2.0-6.0	0.05-0.07	6.6-8.4	<2	Low	0.10	1	4
	3-13	10-18	2.0-6.0	0.08-0.10	6.6-8.4	<2	Low	0.15		
	13	---	---	---	---	---	---	---		
Rock outcrop.										
494	0-10	40-60	0.06-0.2	0.11-0.13	7.4-7.8	8-16	High	0.24	5	4
Catman	10-60	35-60	<0.06	0.12-0.14	7.4-8.4	8-16	High	0.24		
495*:										
Mion	0-3	30-35	0.2-0.6	0.14-0.16	7.4-8.4	<2	Moderate	0.15	1	7
	3-20	40-55	<0.06	0.15-0.17	7.4-8.4	<2	High	0.24		
	20	---	---	---	---	---	---	---		
Catman	0-3	30-40	0.2-0.6	0.17-0.19	7.4-7.8	2-8	Moderate	0.32	5	4
	3-60	35-60	<0.06	0.15-0.17	7.4-8.4	2-8	High	0.37		

See footnote at end of table.

TABLE 10.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
497	0-4	0-6	>20	0.06-0.07	6.6-7.8	<2	Low	0.17	5	1
Royosa	4-60	0-10	>20	0.05-0.08	6.6-7.8	<2	Low	0.17		
517*:										
Loarc	0-4	2-8	6.0-20	0.07-0.09	6.6-7.3	<2	Low	0.17	5	2
	4-25	18-30	0.6-2.0	0.12-0.14	6.6-8.4	<2	Moderate	0.32		
	25-60	10-15	2.0-6.0	0.11-0.13	6.6-9.0	<2	Low	0.24		
Telescope	0-2	3-11	6.0-20	0.06-0.08	6.6-7.8	<2	Low	0.17	5	2
	2-60	5-15	6.0-20	0.12-0.14	7.4-7.8	<2	Low	0.28		
525	0-3	3-11	6.0-20	0.06-0.08	6.6-7.8	<2	Low	0.17	5	2
Telescope	3-23	5-15	6.0-20	0.12-0.14	6.6-7.8	<2	Low	0.28		
	23-60	3-11	6.0-20	0.09-0.11	7.4-8.4	<2	Low	0.17		
540	0-7	20-30	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low	0.15	3	6
Goldust	7-27	35-55	0.06-0.2	0.09-0.11	6.6-7.8	<2	Moderate	0.10		
	27-60	18-20	2.0-6.0	0.04-0.06	7.4-8.4	<2	Low	0.10		
550	0-3	20-25	0.6-2.0	0.13-0.15	6.6-7.3	<2	Low	0.32	5	5
Bario	3-27	35-60	0.2-0.6	0.15-0.17	6.6-7.8	<2	High	0.32		
	27-60	35-60	0.2-0.6	0.15-0.17	7.9-9.0	<2	High	0.32		
551	0-2	10-18	2.0-6.0	0.08-0.10	6.6-7.3	<2	Low	0.15	1	4
Pleioville	2-12	35-50	0.06-0.2	0.14-0.16	6.6-7.3	<2	High	0.15		
	12-24	35-55	0.06-0.2	0.07-0.09	6.6-7.8	<2	Moderate	0.10		
	24	---	---	---	---	---	---	---		
555*:										
Motoqua	0-3	10-20	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low	0.10	1	7
	3-10	15-32	0.6-2.0	0.08-0.12	6.1-7.3	<2	Low	0.10		
	10	---	---	---	---	---	---	---		
Rock outcrop.										
560	0-5	10-20	2.0-6.0	0.12-0.14	6.6-7.3	<2	Low	0.24	4	3
Maia	5-10	25-35	0.2-0.6	0.16-0.19	6.6-7.8	<2	Moderate	0.32		
	10-23	25-35	0.2-0.6	0.12-0.14	7.4-8.4	<2	Moderate	0.28		
	23-60	15-25	2.0-6.0	0.11-0.13	8.5-9.0	<2	Low	0.20		
565	0-3	20-27	0.6-2.0	0.17-0.20	6.1-6.5	<2	Low	0.37	5	6
Celsosprings	3-13	35-45	0.06-0.2	0.16-0.18	6.6-7.3	<2	High	0.32		
	13-26	35-45	0.06-0.2	0.13-0.15	6.6-7.8	<2	High	0.15		
	26-33	35-45	0.06-0.2	0.13-0.15	7.4-8.4	<2	High	0.15		
	33-60	20-35	0.6-2.0	0.16-0.18	7.4-8.4	<2	Moderate	0.24		
575*:										
Joachem	0-3	8-15	2.0-6.0	0.08-0.10	7.4-7.8	<2	Low	0.15	1	4
	3-8	9-18	0.6-2.0	0.10-0.12	7.4-8.4	<2	Low	0.20		
	8-11	5-10	0.6-2.0	0.07-0.10	7.9-9.0	<2	Low	0.15		
	11	---	---	---	---	---	---	---		
Rock outcrop.										
580*:										
Loarc	0-3	10-15	2.0-6.0	0.12-0.14	6.6-7.3	<2	Low	0.24	5	3
	3-60	18-30	0.6-2.0	0.12-0.14	6.6-8.4	<2	Moderate	0.32		
Datil	0-2	15-25	0.6-2.0	0.12-0.14	7.4-7.8	<2	Low	0.20	5	6
	2-18	20-35	0.6-2.0	0.15-0.18	7.4-7.8	<2	Moderate	0.32		
	18-60	15-25	0.6-2.0	0.12-0.15	7.4-8.4	<2	Low	0.32		
585*:										
Abrazo	0-7	10-20	0.06-2.0	0.16-0.18	6.6-7.3	<2	Low	0.37	2	5
	7-36	35-55	0.06-0.2	0.14-0.16	7.4-8.4	<2	High	0.24		
	36	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 10.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodi-bility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
585*:										
Apache	0-3	10-17	2.0-6.0	0.09-0.11	7.4-8.4	<2	Low	0.15	1	4
	3-10	15-25	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low	0.37		
	10-14	10-18	2.0-6.0	0.09-0.11	7.4-8.4	<2	Low	0.15		
	14	---	---	---	---	---	-------------	----		
590*:										
Penistaja	0-3	10-20	2.0-6.0	0.13-0.15	6.6-8.4	<2	Low	0.24	5	3
	3-25	20-30	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.32		
	25-60	15-25	2.0-6.0	0.12-0.15	6.6-8.4	<2	Low	0.28		
Viuda	0-2	10-20	2.0-6.0	0.08-0.10	6.6-7.3	<2	Low	0.15	1	4
	2-8	35-50	0.06-0.2	0.14-0.16	6.6-7.8	<2	High	0.15		
	8-15	27-35	0.2-0.6	0.13-0.15	7.9-9.0	<2	Moderate	0.15		
	15	---	---	---	---	---	-------------	----		
Rock outcrop.										
592*:										
Celacy	0-5	5-10	2.0-6.0	0.06-0.08	7.4-7.8	<2	Low	0.17	2	2
	5-16	18-35	0.6-2.0	0.16-0.18	7.4-7.8	<2	Moderate	0.37		
	16-22	18-30	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low	0.32		
	22	---	---	---	---	---	-------------	----		
Rock outcrop.										
595*:										
Amenson	0-4	20-27	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low	0.37	1	4L
	4-18	15-27	0.6-2.0	0.12-0.14	7.4-9.0	<2	Low	0.28		
	18	---	---	---	---	---	-------------	----		
Gustspring	0-3	15-20	0.6-2.0	0.15-0.17	6.6-7.3	<2	Low	0.37	3	5
	3-19	18-35	0.6-2.0	0.08-0.10	6.6-8.4	<2	Moderate	0.20		
	19-31	10-18	2.0-6.0	0.05-0.07	7.9-9.0	<2	Low	0.15		
	31-60	5-10	6.0-20	0.02-0.04	7.4-8.4	<2	Low	0.05		
606*:										
Tolman	0-2	15-27	0.6-2.0	0.08-0.10	6.1-7.8	<2	Low	0.05	1	8
	2-9	20-35	0.6-2.0	0.05-0.11	6.1-7.8	<2	Low	0.10		
	9	---	---	---	---	---	-------------	----		
Rock outcrop.										
612*:										
Typic Argiborolls.										
Tolman	0-3	15-27	0.6-2.0	0.08-0.10	6.1-7.8	<2	Low	0.05	1	8
	3-13	27-35	0.6-2.0	0.05-0.11	6.1-7.8	<2	Low	0.05		
	13	---	---	---	---	---	-------------	----		
Motoqua	0-2	10-18	0.6-2.0	0.08-0.10	6.6-7.3	<2	Low	0.05	1	8
	2-14	15-30	0.6-2.0	0.09-0.11	6.6-7.3	<2	Low	0.15		
	14	---	---	---	---	---	-------------	----		
624 Brycan	0-4	15-20	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low	0.37	5	5
	4-60	22-30	0.6-2.0	0.17-0.19	7.4-7.8	<2	Low	0.32		
625*:										
Coni	0-1	10-20	2.0-6.0	0.05-0.07	6.1-7.3	<2	Low	0.10	1	4L
	1-15	18-35	0.2-0.6	0.15-0.17	6.1-7.8	<2	Moderate	0.32		
	15	---	---	---	---	---	-------------	----		
Tolman	0-4	12-20	2.0-6.0	0.12-0.14	6.1-7.8	<2	Low	0.20	1	6
	4-18	20-35	0.6-2.0	0.05-0.11	6.1-7.8	<2	Low	0.10		
	18	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 10.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
635*:										
Jacee	0-2	18-27	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low	0.37	2	6
	2-24	35-50	0.06-0.2	0.16-0.18	7.4-8.4	<2	High	0.28		
	24	---	---	---	---	---	-----------	----		
Mion	0-3	20-27	0.6-2.0	0.16-0.18	6.6-8.4	<2	Low	0.37	1	6
	3-18	38-55	<0.06	0.15-0.17	7.4-8.4	<2	High	0.32		
	18	---	---	---	---	---	-----------	----		
Celacy	0-3	15-20	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low	0.37	2	5
	3-12	18-35	0.6-2.0	0.16-0.18	7.4-7.8	<2	Moderate	0.37		
	12-22	18-30	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low	0.32		
	22	---	---	---	---	---	-----------	----		
645*:										
Albinas	0-2	10-20	2.0-6.0	0.11-0.13	6.6-7.8	<2	Low	0.24	5	3
	2-45	25-35	0.6-2.0	0.14-0.21	6.6-9.0	<2	Moderate	0.28		
	45-63	10-20	0.6-2.0	0.16-0.18	7.9-9.0	<2	Low	0.37		
Datil	0-4	15-25	0.6-2.0	0.15-0.17	7.4-7.8	<2	Low	0.37	5	5
	4-22	20-35	0.6-2.0	0.15-0.18	7.4-7.8	<2	Moderate	0.32		
	22-60	15-25	0.6-2.0	0.09-0.11	7.4-8.4	<2	Low	0.20		
650*:										
Typic Ustorthents.										
Hickman	0-3	15-27	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low	0.37	5	6
	3-60	18-35	0.2-0.6	0.14-0.16	7.4-9.0	<2	Moderate	0.32		
Majada	0-3	10-20	2.0-6.0	0.07-0.09	6.6-7.8	<2	Low	0.10	3	4L
	3-17	25-35	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low	0.10		
	17-60	15-25	0.6-2.0	0.07-0.09	7.9-9.0	<2	Low	0.10		
655*:										
Majada	0-3	15-25	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low	0.10	3	7
	3-21	25-35	0.6-2.0	0.08-0.10	6.6-8.4	<2	Low	0.10		
	21-60	15-25	0.6-2.0	0.07-0.09	7.9-9.0	<2	Low	0.10		
Lapdun	0-2	15-20	0.6-2.0	0.07-0.09	7.4-9.0	<2	Low	0.10	3	7
	2-36	20-30	0.6-2.0	0.08-0.10	7.9-9.0	<2	Moderate	0.10		
	36-60	5-10	6.0-20	0.03-0.05	7.9-9.0	<2	Low	0.05		
660*:										
Datil	0-2	9-17	2.0-6.0	0.12-0.14	7.4-7.8	<2	Low	0.24	5	3
	2-60	15-25	0.6-2.0	0.12-0.15	7.4-8.4	<2	Low	0.32		
Loarc	0-3	10-15	2.0-6.0	0.12-0.14	6.6-7.3	<2	Low	0.24	5	3
	3-19	18-30	0.6-2.0	0.12-0.14	6.6-8.4	<2	Moderate	0.32		
	19-60	10-15	2.0-6.0	0.06-0.08	6.6-9.0	<2	Low	0.17		
665*:										
Veteado	0-6	15-20	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low	0.24	5	3
	6-16	35-60	0.06-0.2	0.14-0.16	6.6-7.8	<2	High	0.24		
	16-28	25-35	0.2-0.6	0.15-0.17	7.4-8.4	<2	Moderate	0.32		
	28-60	20-25	0.6-2.0	0.13-0.15	7.9-9.0	<2	Low	0.32		
Penistaja	0-5	10-20	2.0-6.0	0.11-0.13	6.6-8.4	<2	Low	0.24	5	3
	5-20	20-30	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.32		
	20-60	15-25	2.0-6.0	0.12-0.15	6.6-8.4	<2	Low	0.24		
670*:										
Diatee	0-2	12-17	2.0-6.0	0.08-0.10	6.6-7.3	<2	Low	0.15	3	4
	2-14	20-35	0.6-2.0	0.12-0.14	6.6-7.3	<2	Moderate	0.15		
	14-18	18-25	0.6-2.0	0.07-0.09	6.6-7.3	<2	Low	0.10		
	18-60	2-7	>20	0.02-0.04	6.6-7.8	<2	Low	0.05		

See footnote at end of table.

TABLE 10.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
670*:										
Flugle	0-4	10-20	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low	0.37	5	5
	4-25	20-35	0.6-2.0	0.16-0.18	6.6-8.4	<2	Moderate	0.37		
	25-60	10-20	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low	0.24		
671*:										
Smilo	0-5	15-27	0.6-2.0	0.12-0.14	5.6-6.5	<2	Low	0.20	1	7
	5-25	35-60	0.06-0.2	0.13-0.15	6.6-7.3	<2	High	0.15		
	25-30	35-60	0.06-0.2	0.13-0.15	6.6-7.3	<2	High	0.15		
	30	---	---	---	---	---	-------------	----		
Adman	0-3	22-27	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low	0.20	1	7
	3-19	35-55	0.06-0.2	0.12-0.14	6.6-7.3	<2	High	0.20		
	19	---	---	---	---	---	-------------	----		
675*:										
Loarc	0-2	10-15	2.0-6.0	0.12-0.14	6.6-7.3	<2	Low	0.24	5	3
	2-23	18-30	0.6-2.0	0.12-0.14	6.6-8.4	<2	Moderate	0.32		
	23-60	10-15	2.0-6.0	0.11-0.13	6.6-9.0	<2	Low	0.24		
Flugle	0-3	10-17	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low	0.24	5	3
	3-29	20-35	0.6-2.0	0.16-0.18	6.6-8.4	<2	Moderate	0.37		
	29-60	10-20	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low	0.24		
Manzano	0-2	10-25	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low	0.37	5	6
	2-60	18-34	0.2-0.6	0.16-0.21	6.6-8.4	<2	Moderate	0.32		
680 Jacques	0-5	30-40	0.2-0.6	0.19-0.21	6.6-7.8	<2	Moderate	0.32	5	6
	5-60	35-45	0.06-0.2	0.14-0.17	6.6-8.4	<2	High	0.24		
690*:										
Millpaw	0-4	18-25	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low	0.37	5	6
	4-35	35-50	0.06-0.2	0.17-0.19	7.4-7.8	<2	High	0.28		
	35-60	18-35	0.6-2.0	0.16-0.18	7.4-8.4	<2	Moderate	0.37		
Datil	0-3	9-17	2.0-6.0	0.12-0.14	7.4-7.8	<2	Low	0.28	5	3
	3-60	15-25	0.6-2.0	0.12-0.15	7.4-8.4	<2	Low	0.32		
700*:										
Hiarc	0-7	15-20	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low	0.24	2	3
	7-19	20-25	0.6-2.0	0.15-0.17	6.6-7.3	<2	Low	0.37		
	19-25	18-25	0.6-2.0	0.11-0.13	6.6-7.3	<2	Low	0.24		
	25	---	---	---	---	---	-------------	----		
Loarc	0-2	10-15	2.0-6.0	0.12-0.14	6.6-7.3	<2	Low	0.28	5	3
	2-14	18-30	0.6-2.0	0.12-0.14	6.6-8.4	<2	Moderate	0.32		
	14-60	10-15	2.0-6.0	0.11-0.13	6.6-9.0	<2	Low	0.24		
Typic Ustorthents.										
705*:										
Parquat	0-2	12-20	2.0-6.0	0.05-0.07	7.4-7.8	<2	Low	0.10	3	4L
	2-12	35-40	0.2-0.6	0.09-0.11	7.4-7.8	<2	Moderate	0.10		
	12-19	35-45	0.2-0.6	0.08-0.10	7.4-7.8	<2	Moderate	0.10		
	19-33	10-20	2.0-6.0	0.09-0.11	7.4-8.4	<2	Low	0.15		
	33-60	5-15	6.0-20	0.04-0.06	7.4-8.4	<2	Low	0.10		
Tafoya	0-3	20-27	0.6-2.0	0.12-0.14	7.4-7.8	<2	Low	0.20	3	6
	3-25	35-40	0.06-0.2	0.09-0.11	7.4-7.8	<2	Moderate	0.10		
	25-60	20-35	0.6-2.0	0.07-0.09	7.4-7.8	<2	Low	0.10		
710*:										
Alegros	0-2	15-25	0.6-2.0	0.12-0.14	6.6-7.3	<2	Low	0.20	3	7
	2-21	35-60	0.06-0.2	0.12-0.14	6.6-7.8	<2	High	0.15		
	21-52	5-15	2.0-6.0	0.04-0.06	7.4-8.4	<2	Low	0.02		
	52-60	0-10	6.0-20	0.02-0.04	7.4-8.4	<2	Low	0.02		

See footnote at end of table.

TABLE 10.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
710*:										
Alegros Variant-	0-2	15-25	0.6-2.0	0.04-0.06	6.6-7.3	<2	Low----------	0.05	4	8
	2-11	35-50	0.2-0.6	0.08-0.10	6.6-7.8	<2	Moderate-----	0.10		
	11-19	35-55	0.06-0.2	0.11-0.13	7.4-8.4	<2	High---------	0.15		
	19-60	5-15	6.0-20	0.06-0.08	7.4-9.0	<2	Low----------	0.15		
715-------------- Guy	0-3	5-12	6.0-20	0.04-0.06	7.4-8.4	<2	Low----------	0.10	4	2
	3-12	5-17	2.0-6.0	0.08-0.10	7.4-8.4	<2	Low----------	0.15		
	12-60	5-17	2.0-6.0	0.10-0.12	7.4-8.4	<2	Low----------	0.20		
720-------------- Gustspring	0-3	10-20	2.0-6.0	0.10-0.12	6.1-7.8	<2	Low----------	0.15	4	4
	3-17	20-30	0.6-2.0	0.14-0.16	6.6-7.8	<2	Moderate-----	0.32		
	17-21	10-20	2.0-6.0	0.09-0.11	7.4-8.4	<2	Low----------	0.15		
	21-60	3-10	6.0-20	0.02-0.04	7.4-8.4	<2	Low----------	0.02		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SOIL AND WATER FEATURES

"Flooding" and terms such as "rare" and "brief" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness		Uncoated steel	Concrete
					In				
330*:									
Tejana-----------	B	None--------	---	---	>60	---	Low------------	High-----	Low.
Rock outcrop.									
335*:									
Ralphston--------	B	None--------	---	---	>60	---	Low------------	High-----	Low.
Amenson----------	D	None--------	---	---	20-40	Hard	Low------------	High-----	Low.
340*:									
Flugle-----------	B	None--------	---	---	>60	---	Moderate-------	High-----	Low.
Typic Ustorthents.									
341*:									
Flugle-----------	B	None--------	---	---	>60	---	Moderate-------	High-----	Low.
Jacques----------	C	Rare--------	---	---	>60	---	Moderate-------	High-----	Low.
347*:									
Datil------------	B	None--------	---	---	>60	---	Low------------	High-----	Low.
Dioxice----------	B	None--------	---	---	>60	---	Low------------	High-----	Low.
365*:									
Cabezon----------	D	None--------	---	---	10-20	Hard	Low------------	Moderate	Low.
Thunderbird------	D	None--------	---	---	20-40	Hard	Low------------	High-----	Low.
Celsosprings-----	C	None--------	---	---	>60	---	Low------------	High-----	Low.
366--------------- Celsosprings	C	None--------	---	---	>60	---	Low------------	High-----	Low.
370*:									
Cabezon----------	D	None--------	---	---	10-20	Hard	Low------------	Moderate	Low.
Rock outcrop.									
371*:									
Smilo------------	C	None--------	---	---	20-40	Hard	Low------------	Moderate	Low.

See footnote at end of table.

TABLE 11.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness		Uncoated steel	Concrete
					In				
371*:									
Adman------------	D	None--------	---	---	10-20	Hard	Low------------	Moderate	Low.
373*:									
Gustspring-------	B	None--------	---	---	>60	---	Low------------	High-----	Low.
Guy--------------	B	None--------	---	---	>60	---	Low------------	High-----	Low.
Typic Ustorthents.									
375*:									
Gustspring-------	B	None--------	---	---	>60	---	Low------------	High-----	Low.
Aridic Ustochrepts.									
382--------------- Datil	B	None--------	---	---	>60	---	Low------------	High-----	Low.
385*:									
Aridic Argiustolls.									
Rock outcrop.									
387*:									
Rock outcrop.									
Aridic Ustochrepts.									
390*:									
Rudd-------------	D	None--------	---	---	12-20	Hard	Moderate-------	High-----	Low.
Modyon-----------	C	None--------	---	---	20-40	Hard	Moderate-------	High-----	Low.
408--------------- Hubbell	B	None--------	---	---	>60	---	Low------------	High-----	Low.
409*:									
Ceniza-----------	B	None--------	---	---	>60	---	Low------------	High-----	Low.
Gatlin-----------	B	None--------	---	---	>60	---	Moderate-------	High-----	Low.

See footnote at end of table.

TABLE 11.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness		Uncoated steel	Concrete
					In				
411*:									
Goesling	B	None	---	---	>60	---	Moderate	High	Low.
Celacy	C	None	---	---	20-40	Soft	Moderate	High	Low.
422*:									
Pietown	B	Occasional	Very brief	Apr-Aug	>60	---	Moderate	Moderate	Low.
Hickman	B	Occasional	Very brief	Apr-Aug	>60	---	Low	High	Low.
424 Manzano	B	Rare	---	---	>60	---	Moderate	High	Low.
425*:									
Catman	D	Occasional	Long	Apr-Aug	>60	---	Low	High	High.
Hickman	B	Occasional	Long	Apr-Aug	>60	---	Low	High	Low.
459 Telescope	A	None	---	---	>60	---	Low	High	Low.
463*:									
Datil	B	None	---	---	>60	---	Low	High	Low.
Dioxice	B	None	---	---	>60	---	Low	High	Low.
471*:									
Faraway	D	None	---	---	8-20	Hard	Moderate	Moderate	Moderate.
Motoqua	D	None	---	---	5-20	Hard	Moderate	Moderate	Low.
Rock outcrop.									
472*:									
Abrazo	D	None	---	---	20-40	Hard	Low	Moderate	Low.
Rock outcrop.									
479 Augustine	B	None	---	---	>60	---	Low	High	Low.
482*:									
Datil	B	None	---	---	>60	---	Low	High	Low.
Guy	B	None	---	---	>60	---	Low	High	Low.

See footnote at end of table.

TABLE 11.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness		Uncoated steel	Concrete
					In				
486*:									
Valnor	C	None	---	---	20-40	Soft	Low	High	Low.
Midnight	D	None	---	---	4-20	Soft	Moderate	Moderate	Low.
487*:									
Ustic Torriorthents.									
Rock outcrop.									
Badland.									
492*:									
Jacee	C	None	---	---	20-40	Soft	Low	High	Low.
Celacy	C	None	---	---	20-40	Soft	Moderate	High	Low.
Rock outcrop.									
493*:									
Mion	D	None	---	---	4-20	Soft	Low	High	Low.
Travessilla	D	None	---	---	6-20	Hard	Low	Moderate	Low.
Rock outcrop.									
494 Catman	D	Frequent	Long	Apr-Oct	>60	---	Low	High	High.
495*:									
Mion	D	None	---	---	4-20	Soft	Low	High	Low.
Catman	D	Occasional	Long	Apr-Oct	>60	---	Low	High	High.
497 Royosa	A	None	---	---	>60	---	Low	Moderate	Low.
517*:									
Loarc	B	None	---	---	>60	---	Low	High	Low.
Telescope	A	None	---	---	>60	---	Low	High	Low.
525 Telescope	A	None	---	---	>60	---	Low	High	Low.

See footnote at end of table.

TABLE 11.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness		Uncoated steel	Concrete
					In				
540 Goldust	C	None	---	---	>60	---	Low	High	Low.
550 Bario	B	None	---	---	>60	---	Low	High	Low.
551 Pleioville	C	None	---	---	20-40	Soft	Low	Moderate	Low.
555*:									
Motoqua	D	None	---	---	10-20	Hard	Moderate	Moderate	Low.
Rock outcrop.									
560 Maia	B	None	---	---	>60	---	Moderate	High	Low.
565 Celsosprings	C	None	---	---	>60	---	Low	High	Low.
575*:									
Joachem	D	None	---	---	6-20	Hard	Moderate	High	Low.
Rock outcrop.									
580*:									
Loarc	B	None	---	---	>60	---	Low	High	Low.
Datil	B	None	---	---	>60	---	Low	High	Low.
585*:									
Abrazo	D	None	---	---	20-40	Hard	Low	High	Low.
Apache	D	None	---	---	11-20	Hard	Low	High	Low.
590*:									
Penistaja	B	None	---	---	>60	---	Moderate	High	Low.
Viuda	D	None	---	---	10-20	Hard	Low	High	Low.
Rock outcrop.									
592*:									
Celacy	C	None	---	---	20-40	Soft	Moderate	High	Low.
Rock outcrop.									

See footnote at end of table.

TABLE 11.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness		Uncoated steel	Concrete
					In				
595*:									
Amenson	D	None	---	---	20-40	Hard	Low	High	Low.
Gustspring	B	None	---	---	>60	---	Low	High	Low.
606*:									
Tolman	D	None	---	---	7-20	Hard	Moderate	High	Low.
Rock outcrop.									
612*:									
Typic Argiborolls.									
Tolman	D	None	---	---	7-20	Hard	Moderate	High	Low.
Motoqua	D	None	---	---	10-20	Hard	Moderate	Moderate	Low.
624 Brycan	B	Occasional	Very brief	May-Jul	>60	---	Moderate	High	Moderate.
625*:									
Coni	D	None	---	---	8-20	Hard	Moderate	Moderate	Low.
Tolman	D	None	---	---	7-20	Hard	Moderate	High	Low.
635*:									
Jacee	C	None	---	---	20-40	Soft	Low	High	Low.
Mion	D	None	---	---	4-20	Soft	Low	High	Low.
Celacy	C	None	---	---	20-40	Soft	Moderate	High	Low.
645*:									
Albinas	B	Rare	---	---	>60	---	Low	High	Low.
Datil	B	None	---	---	>60	---	Low	High	Low.
650*:									
Typic Ustorthents.									
Hickman	B	Occasional	Very brief	Jun-Aug	>60	---	Low	High	Low.
Majada	B	None	---	---	>60	---	Moderate	High	Low.

See footnote at end of table.

TABLE 11.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness		Uncoated steel	Concrete
					In				
655*:									
Majada	B	None	---	---	>60	---	Moderate	High	Low.
Lapdun	B	None	---	---	>60	---	Low	High	Low.
660*:									
Datil	B	None	---	---	>60	---	Low	High	Low.
Loarc	B	None	---	---	>60	---	Low	High	Low.
665*:									
Veteado	C	None	---	---	>60	---	Low	High	Low.
Penistaja	B	None	---	---	>60	---	Moderate	High	Low.
670*:									
Diatee	B	None	---	---	>60	---	Moderate	Moderate	Low.
Flugle	B	None	---	---	>60	---	Moderate	High	Low.
671*:									
Smilo	C	None	---	---	20-40	Hard	Low	Moderate	Low.
Adman	D	None	---	---	10-20	Hard	Low	Moderate	Low.
675*:									
Loarc	B	None	---	---	>60	---	Low	High	Low.
Flugle	B	None	---	---	>60	---	Moderate	High	Low.
Manzano	B	None	---	---	>60	---	Moderate	High	Low.
680 Jacques	C	Occasional	Brief	Jul-Oct	>60	---	Moderate	High	Low.
690*:									
Millpaw	C	None	---	---	>60	---	Low	High	Low.
Datil	B	None	---	---	>60	---	Low	High	Low.
700*:									
Hiarc	C	None	---	---	20-40	Hard	Moderate	Moderate	Low.
Loarc	B	None	---	---	>60	---	Low	High	Low.
Typic Ustorthents.									

See footnote at end of table.

TABLE 11.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness		Uncoated steel	Concrete
					In				
705*:									
Parquat----------	B	None--------	---	---	>60	---	Low------------	High-----	Low.
Tafoya-----------	C	None--------	---	---	>60	---	Low------------	High-----	Low.
710*:									
Alegros----------	C	None--------	---	---	>60	---	Low------------	High-----	Low.
Alegros Variant--	C	None--------	---	---	>60	---	Low------------	High-----	Low.
715--------------- Guy	B	None--------	---	---	>60	---	Low------------	High-----	Low.
720--------------- Gustspring	B	Rare--------	---	---	>60	---	Moderate-------	Moderate	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Abrazo	Fine, mixed, mesic Aridic Argiustolls
Adman	Clayey, mixed Lithic Argiborolls
Albinas	Fine-loamy, mixed, mesic Pachic Argiustolls
Alegros	Clayey over sandy or sandy-skeletal, montmorillonitic, mesic Typic Haplustalfs
Alegros Variant	Clayey-skeletal, montmorillonitic, mesic Typic Haplustalfs
Amenson	Loamy, mixed, mesic, shallow Petrocalcic Paleustolls
Apache	Loamy, mixed, mesic Lithic Haplustolls
Aridic Argiustolls	Aridic Argiustolls
Aridic Ustochrepts	Aridic Ustochrepts
Augustine	Fine-loamy, mixed, mesic Aridic Haplustalfs
Bario	Fine, montmorillonitic Mollic Eutroboralfs
Brycan	Fine-loamy, mixed Cumulic Haploborolls
Cabezon	Clayey, montmorillonitic, mesic Lithic Argiustolls
Catman	Very fine, montmorillonitic (calcareous), mesic Vertic Ustifluvents
Celacy	Fine-loamy, mixed, mesic Aridic Haplustalfs
Celsosprings	Fine, mixed, mesic Aridic Argiustolls
Ceniza	Cindery, mesic Pachic Haplustolls
Coni	Loamy, mixed Lithic Argiborolls
Datil	Fine-loamy, mixed, mesic Aridic Argiustolls
Diatee	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aridic Haplustalfs
Dioxice	Fine-loamy, mixed, mesic Aridic Calciustolls
Faraway	Loamy-skeletal, mixed, mesic Lithic Haplustolls
Flugle	Fine-loamy, mixed, mesic Aridic Haplustalfs
Gatlin	Cindery, mesic Aridic Haplustolls
Goesling	Fine-loamy, mixed, mesic Aridic Haplustalfs
Goldust	Clayey-skeletal, mixed, mesic Aridic Argiustolls
Gustspring	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aridic Argiustolls
Guy	Coarse-loamy, mixed, mesic Aridic Calciustolls
Hiarc	Fine-loamy, mixed, mesic Aridic Argiustolls
Hickman	Fine-loamy, mixed, (calcareous), mesic Typic Ustifluvents
Hubbell	Ashy, mesic Aridic Argiborolls
Jacee	Fine, mixed, mesic Aridic Haplustalfs
Jacques	Fine, mixed, mesic Cumulic Haplustolls
Joachem	Loamy, mixed, mesic Lithic Argiustolls
Lapdun	Loamy-skeletal, carbonatic, mesic Aridic Calciustolls
Loarc	Fine-loamy, mixed, mesic Aridic Argiustolls
Maia	Fine-loamy, mixed, mesic Aridic Haplustalfs
Majada	Loamy-skeletal, mixed, mesic Aridic Argiustolls
Manzano	Fine-loamy, mixed, mesic Cumulic Haplustolls
Midnight	Loamy-skeletal, mixed, nonacid, frigid, shallow Typic Ustorthents
Millpaw	Fine, mixed, mesic Pachic Argiustolls
Mion	Clayey, mixed (calcareous), mesic, shallow Ustic Torriorthents
Modyon	Loamy-skeletal, mixed, mesic Aridic Calciustolls
Motoqua	Loamy-skeletal, mixed, mesic Lithic Argiustolls
Parquat	Clayey-skeletal, mixed, mesic Aridic Argiustolls
Penistaja	Fine-loamy, mixed, mesic Ustollic Haplargids
Pietown	Coarse-loamy, mixed (calcareous), mesic Typic Ustifluvents
Pleioville	Clayey-skeletal, montmorillonitic Mollic Eutroboralfs
Ralphston	Fine-loamy, mixed, mesic Torriorthentic Haplustolls
Royosa	Mixed, mesic Typic Ustipsamments
Rudd	Loamy-skeletal, mixed, mesic Lithic Calciustolls
Smilo	Fine, mixed Pachic Argiborolls
Tafoya	Clayey-skeletal, mixed, mesic Aridic Argiustolls
Tejana	Fine-loamy, mixed, mesic Aridic Haplustolls
Telescope	Coarse-loamy, mixed, mesic Aridic Ustochrepts
Thunderbird	Fine, montmorillonitic, mesic Aridic Argiustolls
Tolman	Loamy-skeletal, mixed Lithic Argiborolls
Travessilla	Loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents
Typic Argiborolls	Typic Argiborolls
Typic Ustorthents	Typic Ustorthents
Ustic Torriorthents	Ustic Torriorthents
Valnor	Fine, mixed Mollic Eutroboralfs
Veteado	Fine, mixed, mesic Ustollic Paleargids
Viuda	Clayey, mixed, mesic Lithic Ustollic Haplargids

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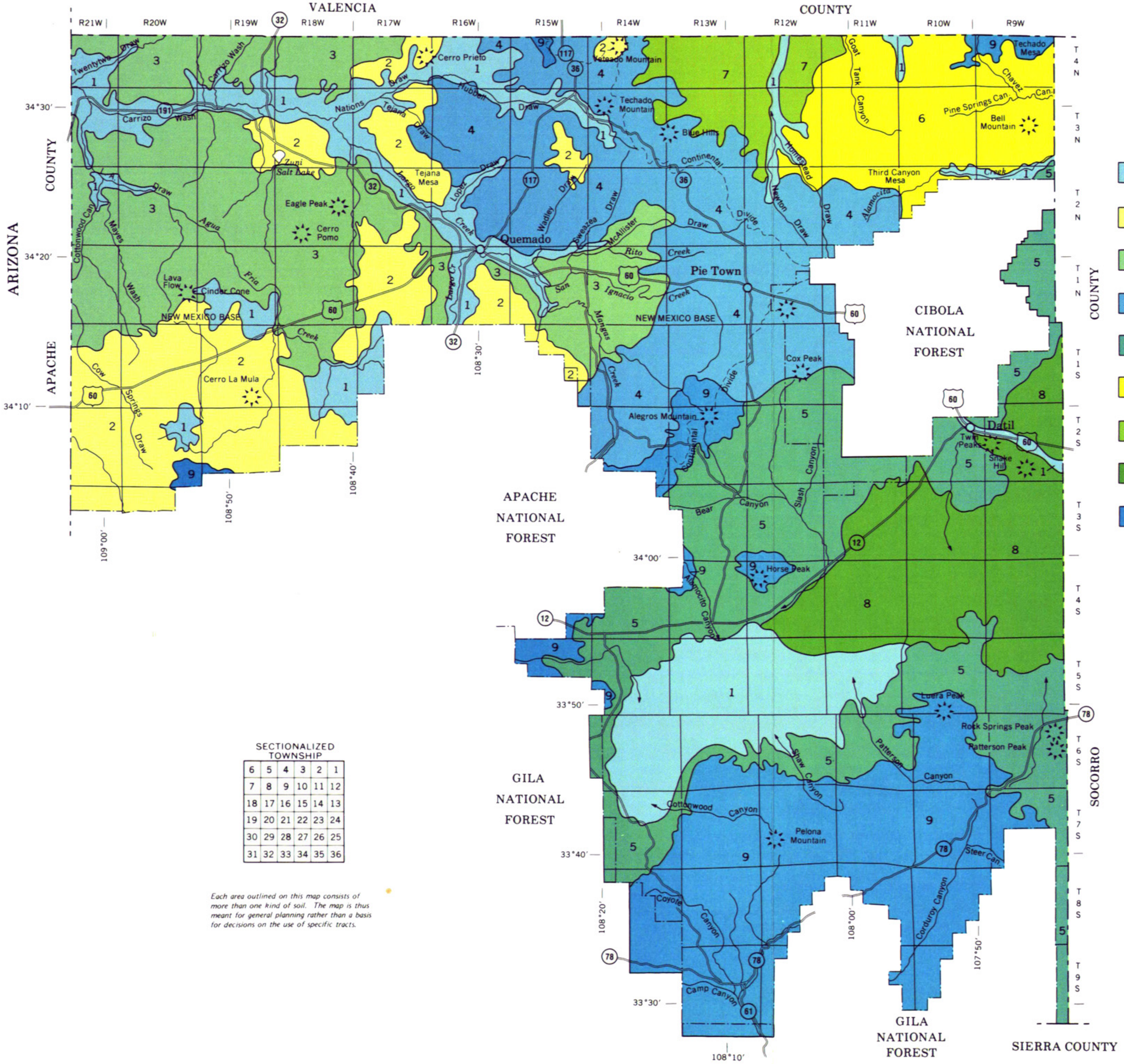


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

1	CATMAN-MANZANO-HICKMAN: Deep, well drained, level to sloping soils; in swales, drainageways, and playas
2	CABEZON-DATIL-HUBBELL: Shallow and deep, well drained, sloping to steep soils; mainly on mesas, hills, and alluvial fans
3	CELACY-DATIL-TYPIC USTORTHENTS: Shallow to deep, well drained, sloping to steep soils; on plains, alluvial fans, and hills
4	FLUGLE-LOARC-TYPIC USTORTHENTS: Shallow to deep, well drained, level to steep soils; on alluvial fans, hills, and ridges
5	MOTOQUA-DATIL-ABRAZO: Shallow to deep, well drained, sloping to steep soils; on alluvial fans, hills, plains, and ridges
6	MION-JACEE-ROCK OUTCROP: Shallow and moderately deep, well drained, level to steep soils; on ridges, hills, plains, and alluvial fans
7	PENISTAJA-VETEADO: Deep, well drained, sloping soils; on plains and alluvial fans
8	TELESCOPE-LOARC-AUGUSTINE: Deep, well drained, level to sloping soils; on alluvial fans and hills
9	TOLMAN-SMILO-PLEIOVILLE: Shallow and moderately deep, well drained, level to steep soils; on hills, mountains, alluvial fans, and plains

Compiled 1984

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NEW MEXICO AGRICULTURAL EXPERIMENT STATION

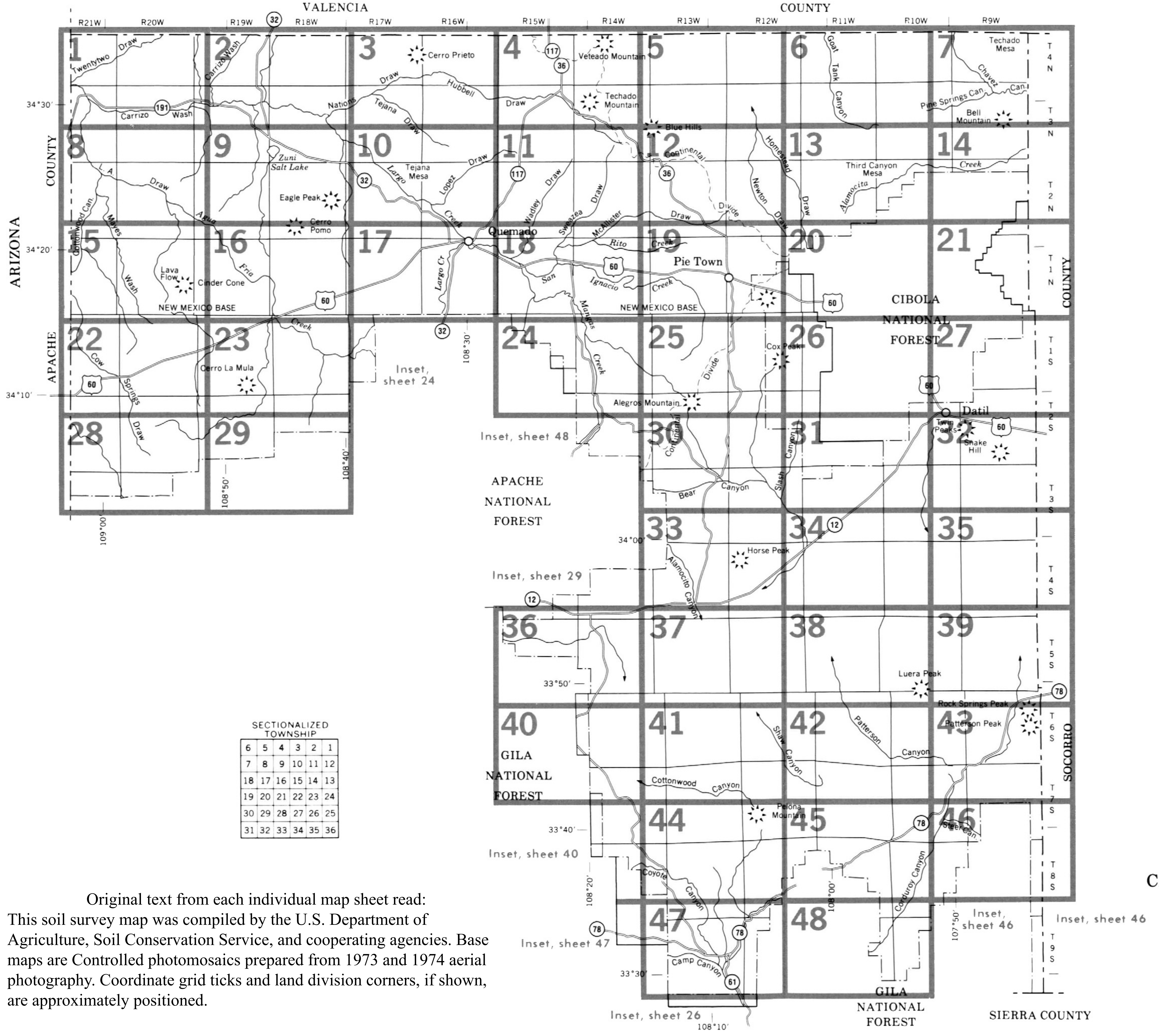
GENERAL SOIL MAP

CATRON COUNTY, NEW MEXICO, NORTHERN PART

Scale 1:506880

2 0 2 4 6 8 Miles

2 0 8 16 Km



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Original text from each individual map sheet read:
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are Controlled photomosaics prepared from 1973 and 1974 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS

CATRON COUNTY, NEW MEXICO, NORTHERN PART

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

CATRON COUNTY, NEW MEXICO, NORTHERN PART

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NEW MEXICO AGRICULTURAL EXPERIMENT STATION

SOIL LEGEND

NUMBERICAL

SYMBOL	NAME
330	Tejana-Rock outcrop complex, 3 to 15 percent slopes
335	Ralphston-Amenson loams, 1 to 9 percent slopes
340	Flugle-Typic Ustorthents association, 2 to 15 percent slopes
341	Flugle-Jacques association, 1 to 5 percent slopes
347	Datil-Dioxice complex, 1 to 5 percent slopes
365	Cabezon-Thunderbird-Celsosprings complex, 3 to 25 percent slopes
366	Celsosprings stony loam, 1 to 8 percent slopes
370	Cabezon-Rock outcrop complex, 3 to 50 percent slopes
371	Smilo-Adman complex, 0 to 9 percent slopes
373	Gustspring-Guy-Typic Ustorthents complex, 1 to 10 percent slopes
375	Gustspring-Aridic Ustochrepts complex, 5 to 40 percent slopes
382	Datil gravelly fine sandy loam, 1 to 6 percent slopes
385	Aridic Argiustolls-Rock outcrop complex, 15 to 45 percent slopes
387	Rock outcrop-Aridic Ustochrepts complex, 10 to 25 percent slopes
390	Rudd-Modyon complex, 3 to 15 percent slopes
408	Hubbell loamy sand, 1 to 9 percent slopes
409	Ceniza-Gatlin complex, 1 to 15 percent slopes
411	Goesling-Celacy complex, 0 to 10 percent slopes
422	Pietown-Hickman complex, 0 to 5 percent slopes
424	Manzano clay loam, 0 to 2 percent slopes
425	Catman-Hickman complex, 1 to 5 percent slopes
459	Telescope loamy fine sand, 3 to 10 percent slopes
463	Datil-Dioxice association, moist, 3 to 15 percent slopes
471	Faraway-Motoqua-Rock outcrop complex, 8 to 30 percent slopes
472	Abrazo-Rock outcrop complex, 15 to 50 percent slopes
479	Augustine fine sandy loam, 1 to 6 percent slopes
482	Datil-Guy association, 3 to 15 percent slopes
486	Valnor-Midnight association, 1 to 25 percent slopes
487	Ustic Torriorthents-Rock outcrop-Badland complex, 20 to 100 percent slopes
492	Jacee-Celacy-Rock outcrop association, 0 to 9 percent slopes
493	Mion-Travessilla-Rock outcrop complex, 2 to 30 percent slopes
494	Catman silty clay, 0 to 2 percent slopes
495	Mion-Catman association, 2 to 17 percent slopes
497	Royosa fine sand, 3 to 15 percent slopes
517	Loarc-Telescope loamy sands, 0 to 3 percent slopes
525	Telescope loamy sand, 0 to 3 percent slopes
540	Goldust gravelly sandy clay loam, 2 to 8 percent slopes
550	Bario sandy clay loam, 0 to 5 percent slopes
551	Pleioville gravelly sandy loam, 3 to 15 percent slopes
555	Motoqua-Rock outcrop complex, 8 to 30 percent slopes
560	Maia sandy loam, 1 to 8 percent slopes
565	Celsosprings loam, 1 to 8 percent slopes
575	Joachem-Rock outcrop complex, 3 to 15 percent slopes
580	Loarc-Datil complex, moist, 2 to 20 percent slopes
585	Abrazo-Apache complex, 2 to 15 percent slopes
590	Penistaja-Viuda-Rock outcrop association, 0 to 9 percent slopes
592	Celacy-Rock outcrop complex, 2 to 9 percent slopes
595	Amenson-Gustspring loams, 2 to 7 percent slopes
606	Tolman-Rock outcrop complex, 25 to 60 percent slopes
612	Typic Argiborolls-Tolman-Motoqua association, 5 to 60 percent slopes
624	Brycan loam, 0 to 3 percent slopes
625	Coni-Tolman complex, 10 to 40 percent slopes
635	Jacee-Mion-Celacy association, 1 to 10 percent slopes
645	Albinas-Datil complex, 1 to 5 percent slopes
650	Typic Ustorthents-Hickman-Majada association, 1 to 25 percent slopes
655	Majada-Lapdun very cobbly loams, 1 to 8 percent slopes
660	Datil-Loarc association, 1 to 15 percent slopes
665	Veteado-Penistaja sandy loams, 1 to 5 percent slopes
670	Diatee-Flugle association, 1 to 9 percent slopes
671	Smilo-Adman complex, moist, 3 to 15 percent slopes
675	Loarc-Flugle-Manzano association, 1 to 9 percent slopes
680	Jacques clay loam, 1 to 5 percent slopes
690	Millpaw-Datil complex, 0 to 7 percent slopes
700	Hiarc-Loarc-Typic Ustorthents association, 1 to 9 percent slopes
705	Parquat-Tafoya association, 5 to 30 percent slopes
710	Alegros-Alegros Variant complex, 1 to 10 percent slopes
715	Guy gravelly loamy fine sand, 0 to 12 percent slopes
720	Gustspring gravelly fine sandy loam, 0 to 5 percent slopes
W	Water

ALPHABETICAL

SYMBOL	NAME
585	Abrazo-Apache complex, 2 to 15 percent slopes
472	Abrazo-Rock outcrop complex, 15 to 50 percent slopes
645	Albinas-Datil complex, 1 to 5 percent slopes
710	Alegros-Alegros Variant complex, 1 to 10 percent slopes
595	Amenson-Gustspring loams, 2 to 7 percent slopes
385	Aridic Argiustolls-Rock outcrop complex, 15 to 45 percent slopes
479	Augustine fine sandy loam, 1 to 6 percent slopes
550	Bario sandy clay loam, 0 to 5 percent slopes
624	Brycan loam, 0 to 3 percent slopes
370	Cabezon-Rock outcrop complex, 3 to 50 percent slopes
365	Cabezon-Thunderbird-Celsosprings complex, 3 to 25 percent slopes
494	Catman silty clay, 0 to 2 percent slopes
425	Catman-Hickman complex, 1 to 5 percent slopes
592	Celacy-Rock outcrop complex, 2 to 9 percent slopes
565	Celsosprings loam, 1 to 8 percent slopes
366	Celsosprings stony loam, 1 to 8 percent slopes
409	Ceniza-Gatlin complex, 1 to 15 percent slopes
625	Coni-Tolman complex, 10 to 40 percent slopes
382	Datil gravelly fine sandy loam, 1 to 6 percent slopes
347	Datil-Dioxice complex, 1 to 5 percent slopes
463	Datil-Dioxice association, moist, 3 to 15 percent slopes
482	Datil-Guy association, 3 to 15 percent slopes
660	Datil-Loarc association, 1 to 15 percent slopes
670	Diatee-Flugle association, 1 to 9 percent slopes
471	Faraway-Motoqua-Rock outcrop complex, 8 to 30 percent slopes
341	Flugle-Jacques association, 1 to 5 percent slopes
340	Flugle-Typic Ustorthents association, 2 to 15 percent slopes
411	Goesling-Celacy complex, 0 to 10 percent slopes
540	Goldust gravelly sandy clay loam, 2 to 8 percent slopes
720	Gustspring gravelly fine sandy loam, 0 to 5 percent slopes
375	Gustspring-Aridic Ustochrepts complex, 5 to 40 percent slopes
373	Gustspring-Guy-Typic Ustorthents complex, 1 to 10 percent slopes
715	Guy gravelly loamy fine sand, 0 to 12 percent slopes
700	Hiarc-Loarc-Typic Ustorthents association, 1 to 9 percent slopes
408	Hubbell loamy sand, 1 to 9 percent slopes
492	Jacee-Celacy-Rock outcrop association, 0 to 9 percent slopes
635	Jacee-Mion-Celacy association, 1 to 10 percent slopes
680	Jacques clay loam, 1 to 5 percent slopes
575	Joachem-Rock outcrop complex, 3 to 15 percent slopes
580	Loarc-Datil complex, moist, 2 to 20 percent slopes
675	Loarc-Flugle-Manzano association, 1 to 9 percent slopes
517	Loarc-Telescope loamy sands, 0 to 3 percent slopes
560	Maia sandy loam, 1 to 8 percent slopes
655	Majada-Lapdun very cobbly loams, 1 to 8 percent slopes
424	Manzano clay loam, 0 to 2 percent slopes
690	Millpaw-Datil complex, 0 to 7 percent slopes
495	Mion-Catman association, 2 to 17 percent slopes
493	Mion-Travessilla-Rock outcrop complex, 2 to 30 percent slopes
555	Motoqua-Rock outcrop complex, 8 to 30 percent slopes
705	Parquat-Tafoya association, 5 to 30 percent slopes
590	Penistaja-Viuda-Rock outcrop association, 0 to 9 percent slopes
422	Pietown-Hickman complex, 0 to 5 percent slopes
551	Pleioville gravelly sandy loam, 3 to 15 percent slopes
335	Ralphston-Amenson loams, 1 to 9 percent slopes
387	Rock outcrop-Aridic Ustochrepts complex, 10 to 25 percent slopes
497	Royosa fine sand, 3 to 15 percent slopes
390	Rudd-Modyon complex, 3 to 15 percent slopes
371	Smilo-Adman complex, 0 to 9 percent slopes
671	Smilo-Adman complex, moist, 3 to 15 percent slopes
330	Tejana-Rock outcrop complex, 3 to 15 percent slopes
525	Telescope loamy sand, 0 to 3 percent slopes
459	Telescope loamy fine sand, 3 to 10 percent slopes
606	Tolman-Rock outcrop complex, 25 to 60 percent slopes
612	Typic Argiborolls-Tolman-Motoqua association, 5 to 60 percent slopes
650	Typic Ustorthents-Hickman-Majada association, 1 to 25 percent slopes
487	Ustic Torriorthents-Rock outcrop-Badland complex, 20 to 100 percent slopes
486	Valnor-Midnight association, 1 to 25 percent slopes
665	Veteado-Penistaja sandy loams, 1 to 5 percent slopes
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES	
National, state or province	——— – –
County or parish	——— –
Minor civil division	— — —
Reservation (national forest or park, state forest or park, and large airport)	—— · ——
Land grant	—— · · ——
Limit of soil survey (label)	———
Field sheet matchline & neatline	———
AD HOC BOUNDARY (label)	Hedley Airstrip
Small airport, airfield, park, oilfield, cemetery, or flood pool	FLOOD POOL LINE
STATE COORDINATE TICK	——┴——
LAND DIVISION CORNERS (sections and land grants)	└ ┴ ┼ ┬┴
ROADS	
Divided (median shown if scale permits)	═══
Other roads	———
Trail	– – – – –
ROAD EMBLEM & DESIGNATIONS	
Interstate	21
Federal	173
State	28
County, farm or ranch	1283
RAILROAD	—┼—┼—┼—
POWER TRANSMISSION LINE (normally not shown)	···•···•···•··
PIPE LINE (normally not shown)	⊢⊣ ⊢⊣ ⊢⊣ ⊢⊣
FENCE (normally not shown)	—×———×—
LEVEES	
Without road	ııııııııııııı
With road	ııııııııııııı
With railroad	ııııııııııııı
DAMS	
Large (to scale)	
Medium or small	water w
PITS	
Gravel pit	⚒
Mine or quarry	⚒

MISCELLANEOUS CULTURAL FEATURES

Farmstead, house (omit in urban areas)	•
Church	•
School	•
Indian mound (label)	⌒ Indian Mound
Located object (label)	○ Tower
Tank (label)	• Gas
Wells, oil or gas	⊥
Windmill	•
Kitchen midden	⌒

WATER FEATURES

DRAINAGE	
Perennial, double line	≈
Perennial, single line	—·—·—
Intermittent	— · · · —
Drainage end	— · · · →
Canals or ditches	
Double-line (label)	CANAL
Drainage and/or irrigation	—→ · —→
LAKES, PONDS AND RESERVOIRS	
Perennial	water w
Intermittent	int i
MISCELLANEOUS WATER FEATURES	
Marsh or swamp	⩸
Spring	○~
Well, artesian	◆
Well, irrigation	-○-
Wet spot	↓

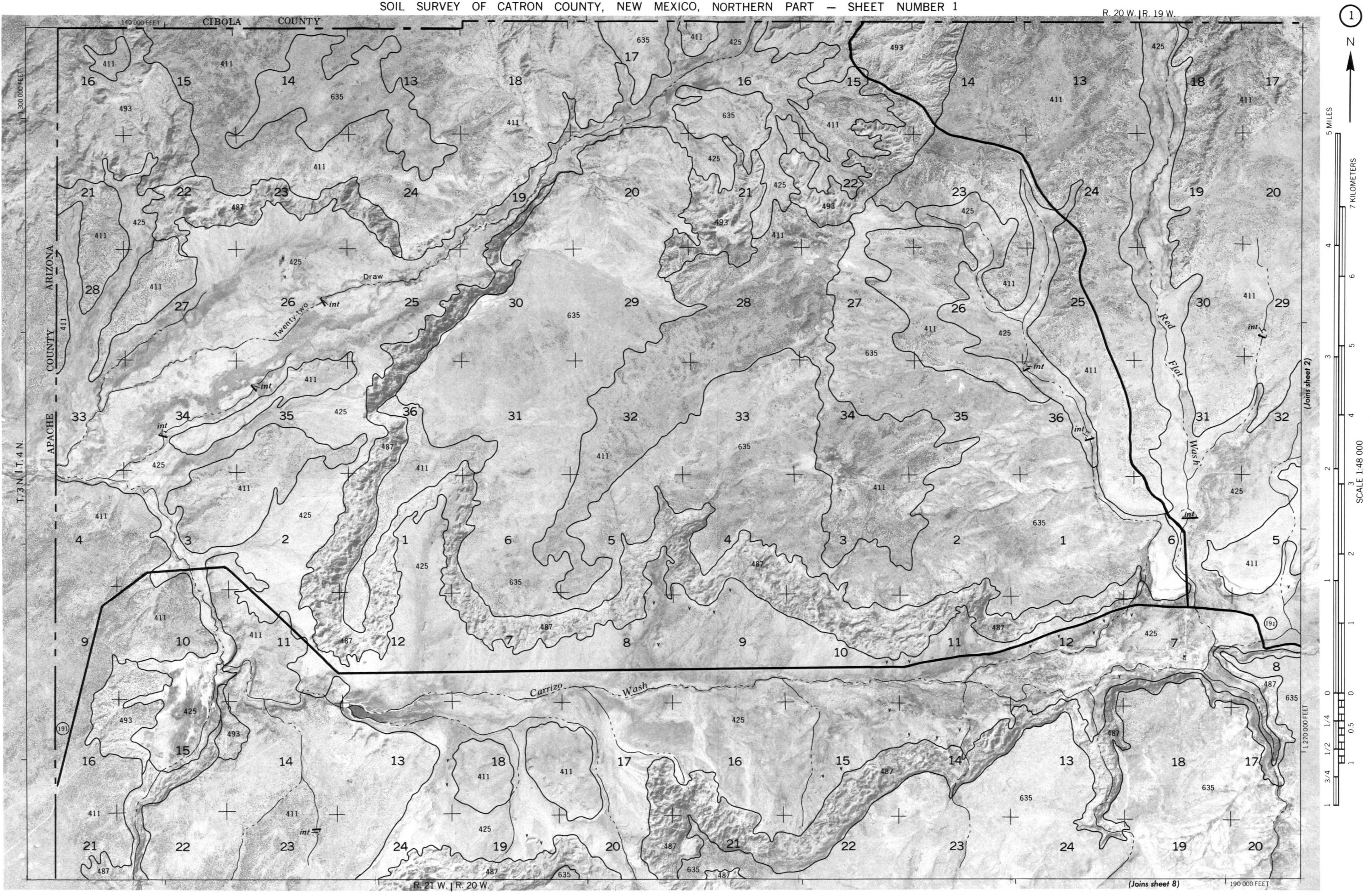
SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS	390 705
ESCARPMENTS	
Bedrock (points down slope)	▾▾▾▾▾▾▾▾▾▾
Other than bedrock (points down slope)	,,,,,,,,,,,,,,,,,,
SHORT STEEP SLOPE	. . . .
GULLY	∧∧∧∧∧∧∧∧
DEPRESSION OR SINK	◊
SOIL SAMPLE SITE (normally not shown)	Ⓢ
MISCELLANEOUS	
Blowout	◡
Clay spot	✳
Gravelly spot	∴
Gumbo, slick or scabby spot (sodic)	ø
Dumps and other similar non soil areas	☰
Prominent hill or peak	☼
Rock outcrop (includes sandstone and shale)	▾
Saline spot	+
Sandy spot	∵
Severely eroded spot	÷
Slide or slip (tips point upslope)	)))
Stony spot, very stony spot	0 ∞

SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 1

CATRON COUNTY, NEW MEXICO, NORTHERN PART NO. 1

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are controlled photomosaics prepared from 1973 and 1974 aerial photography.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



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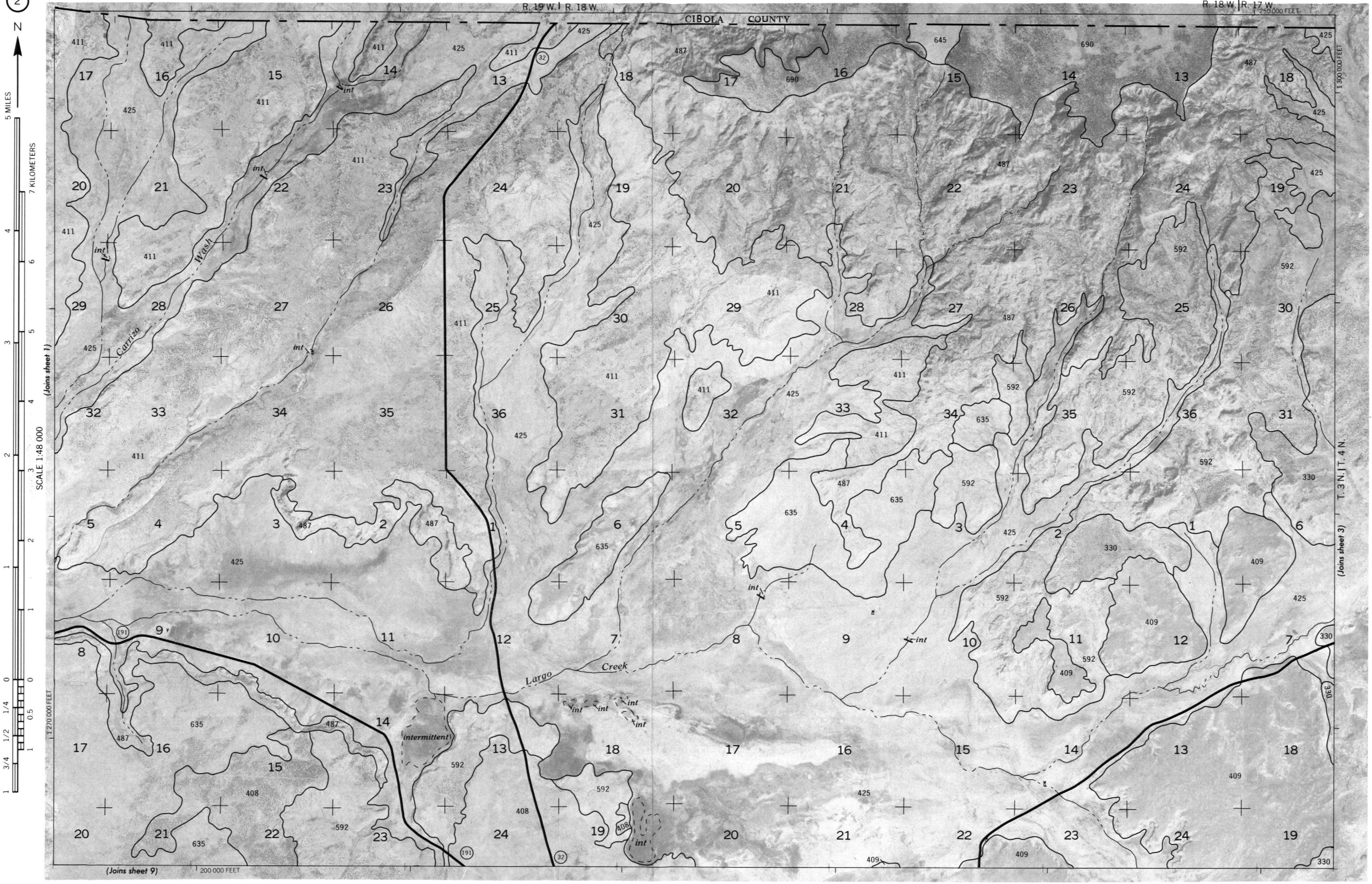
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 2

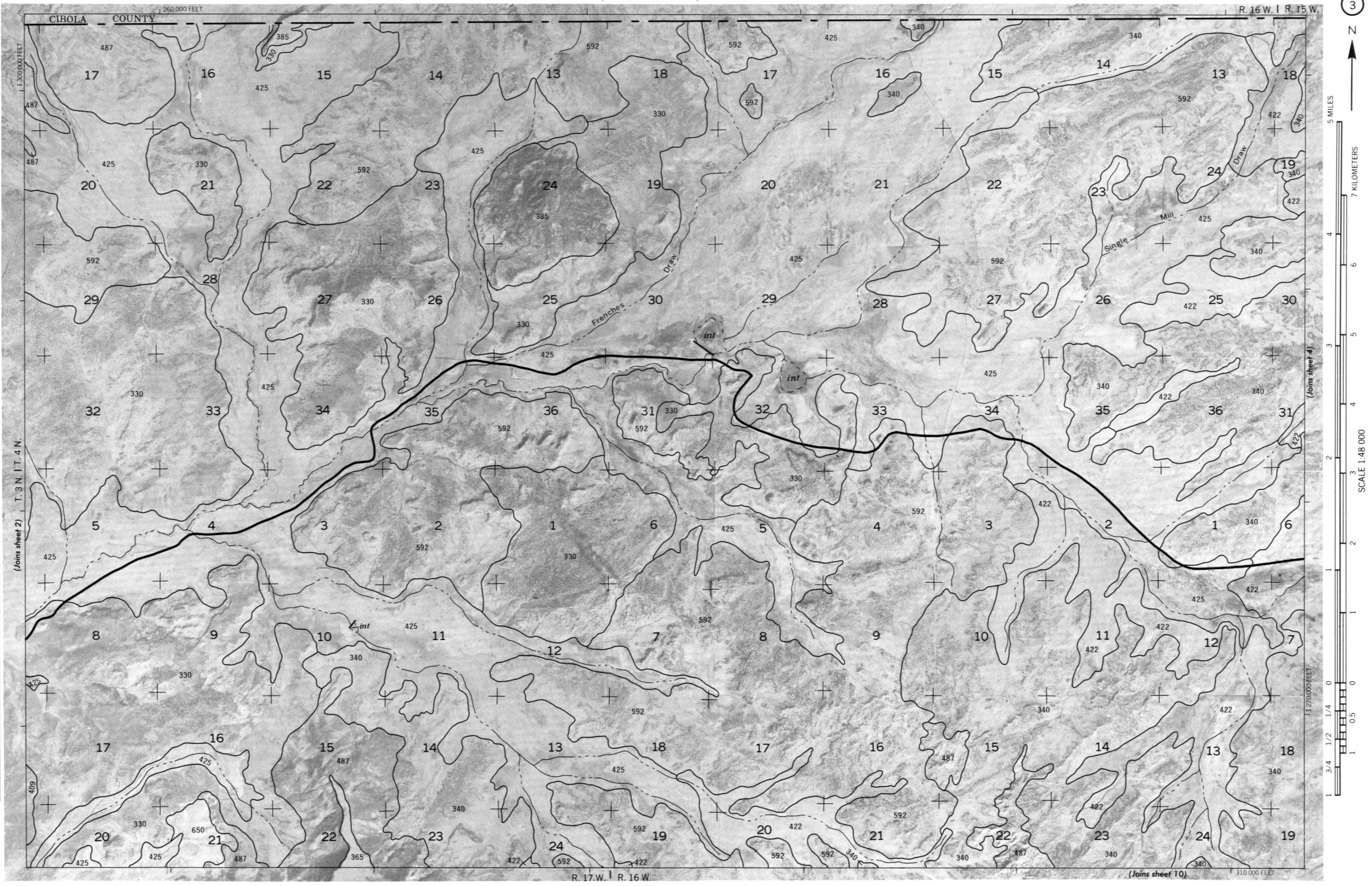


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are controlled photomosaics prepared from 1973 and 1974 aerial photography.

Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CATRON COUNTY, NEW MEXICO, NORTHERN PART NO. 2

SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 3



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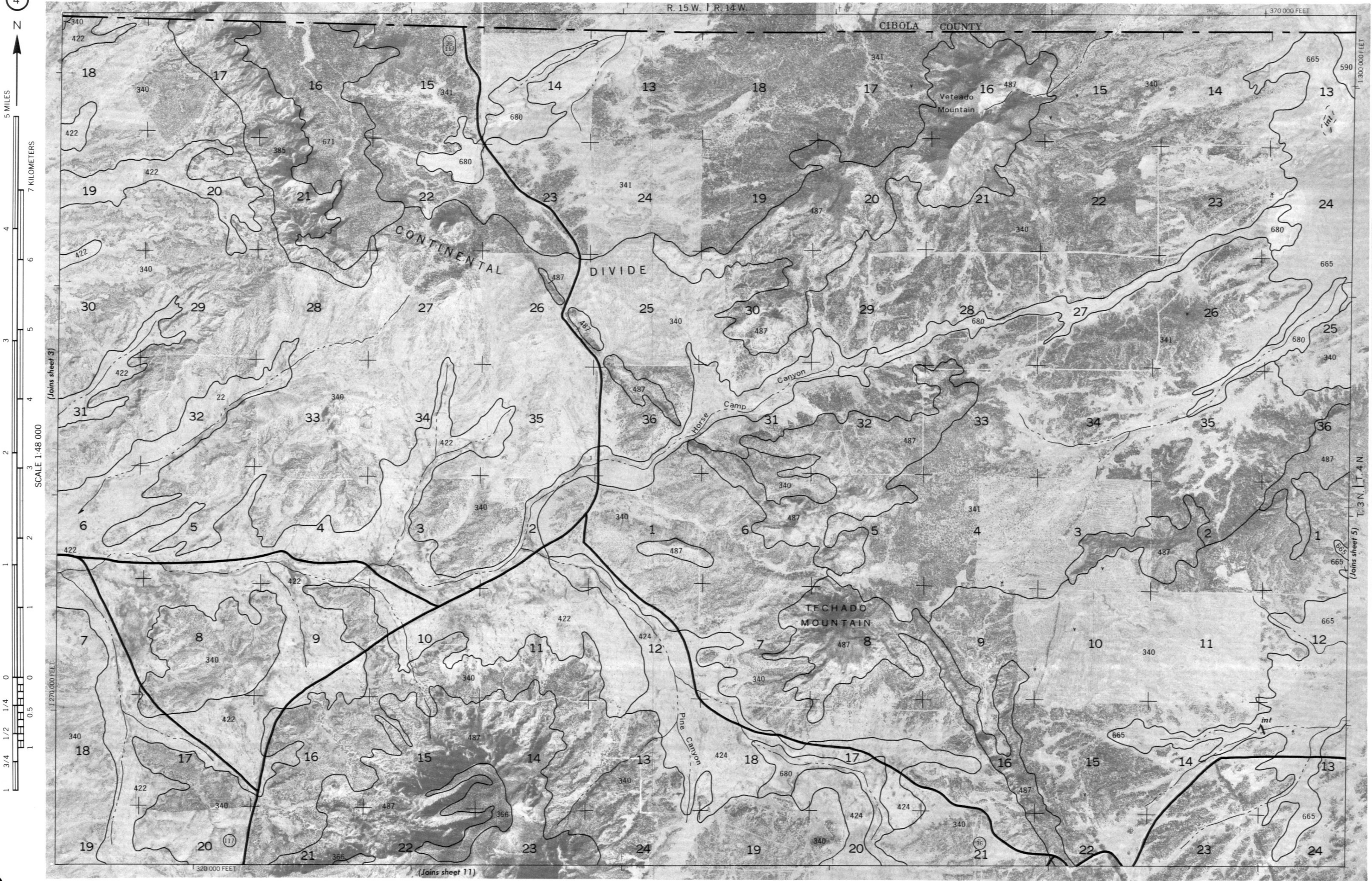
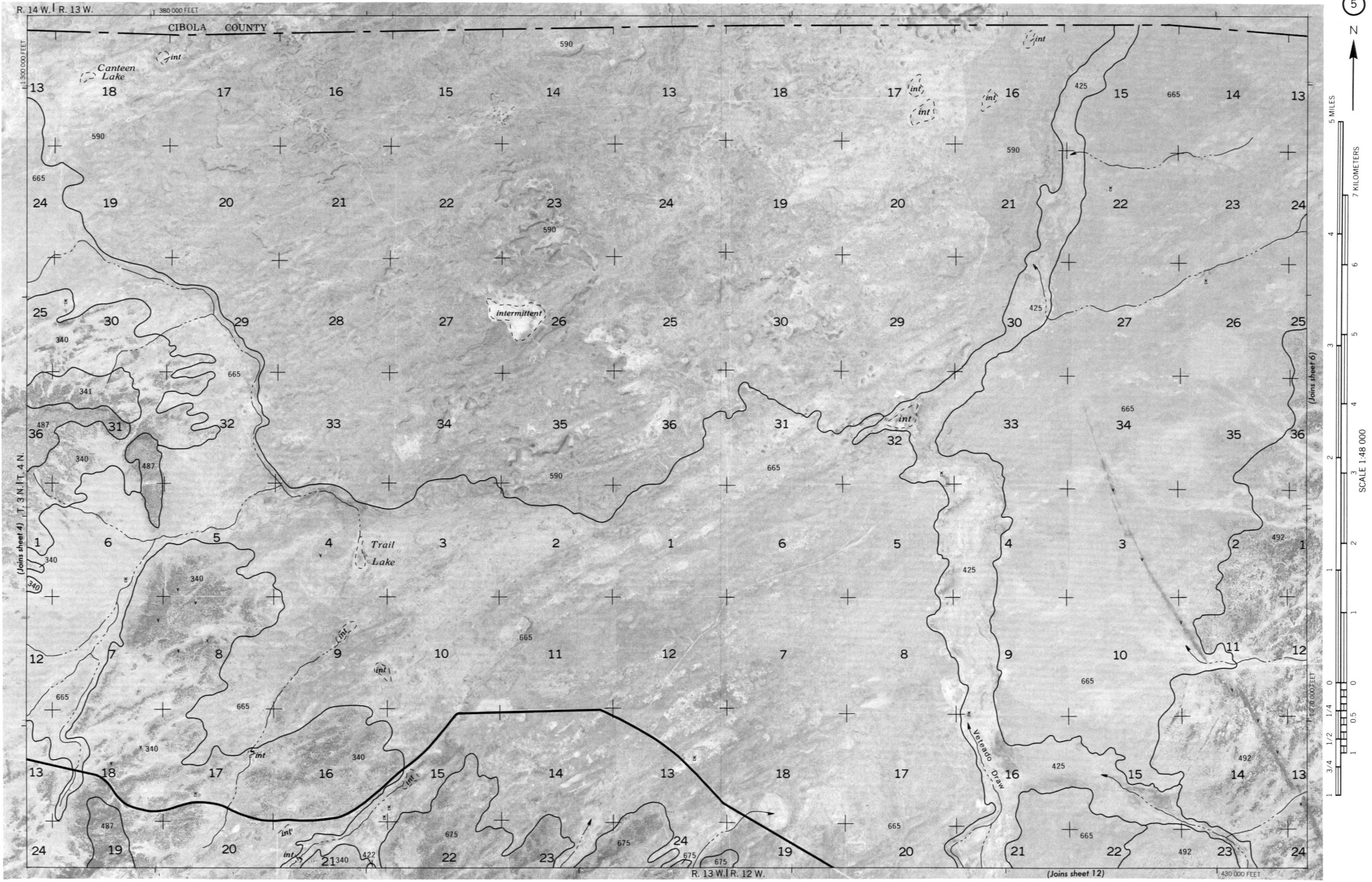
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 4



SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 5



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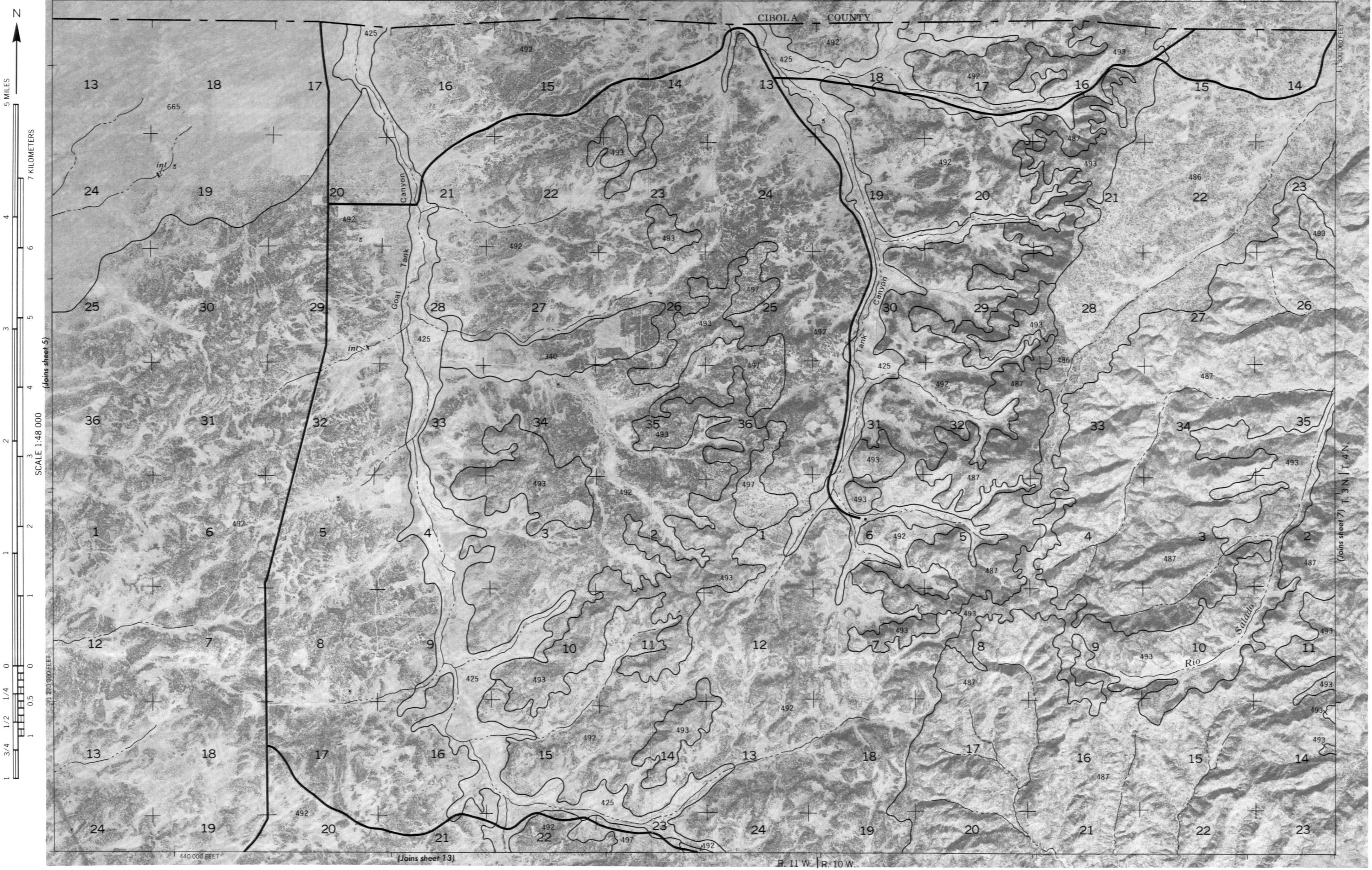
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 6



SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 7

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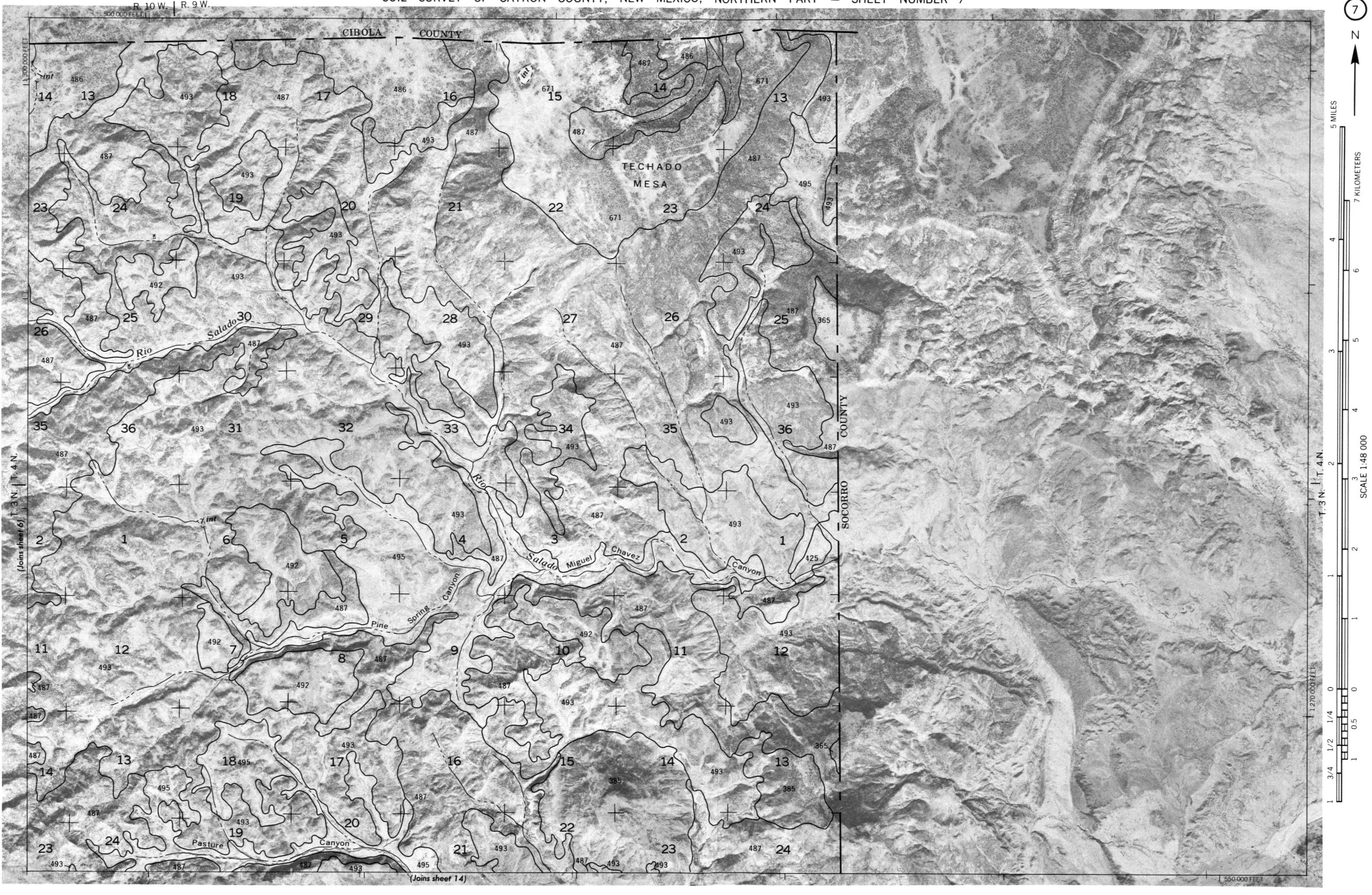
CATRON COUNTY, NEW MEXICO, NORTHERN PART NO. 7

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are controlled photomosaics prepared from 1973 and 1974 aerial photography.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



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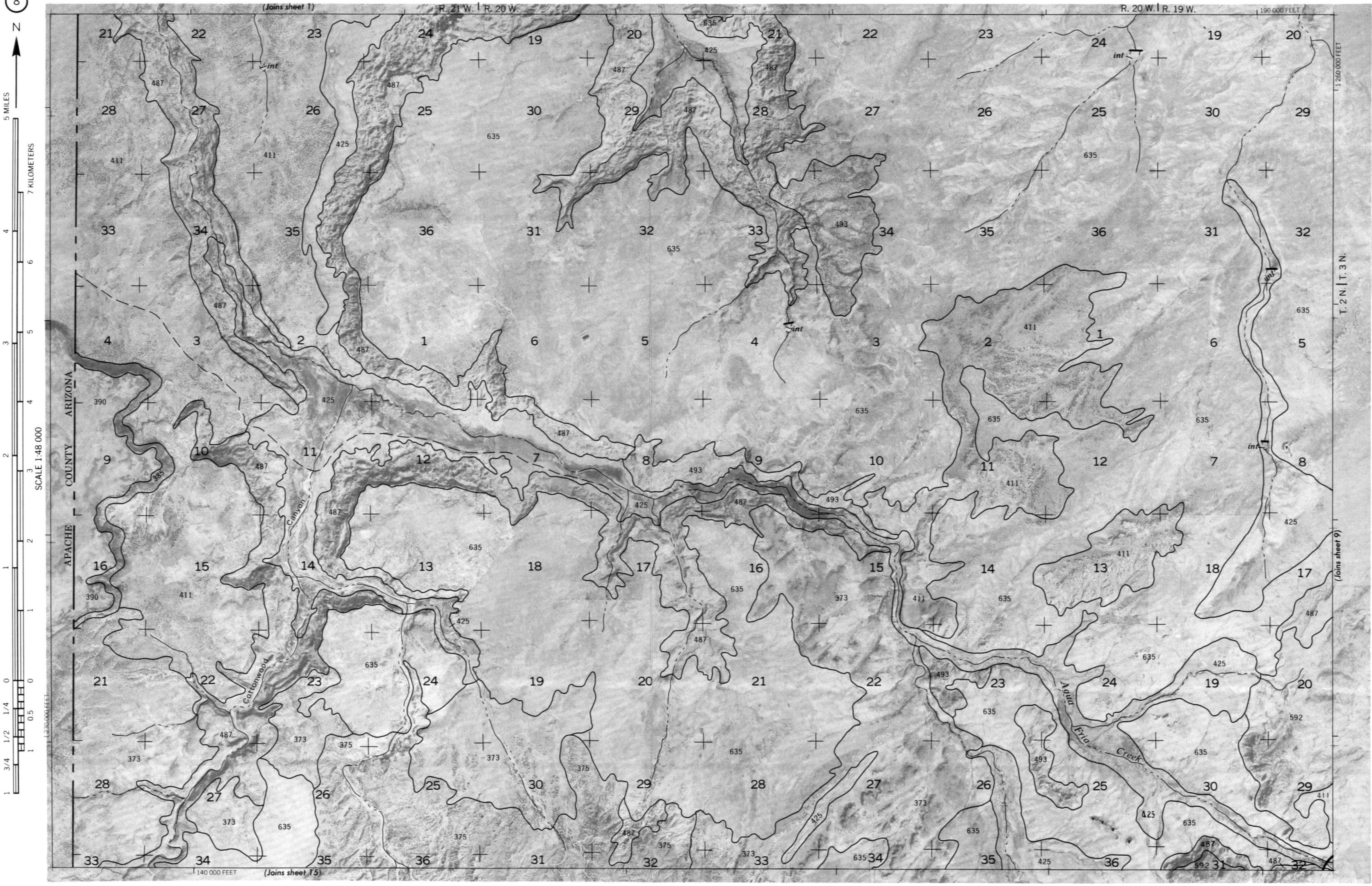

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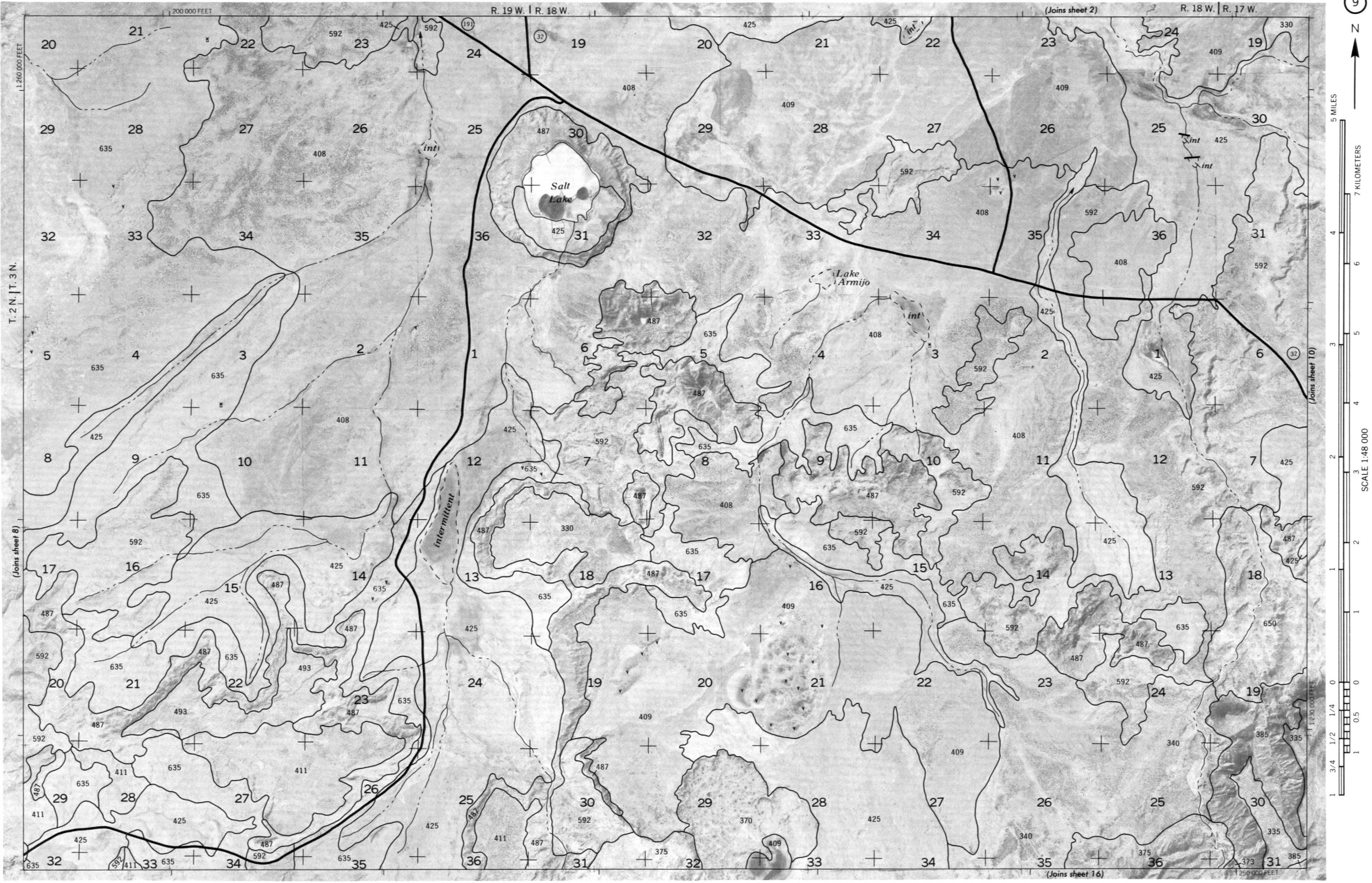

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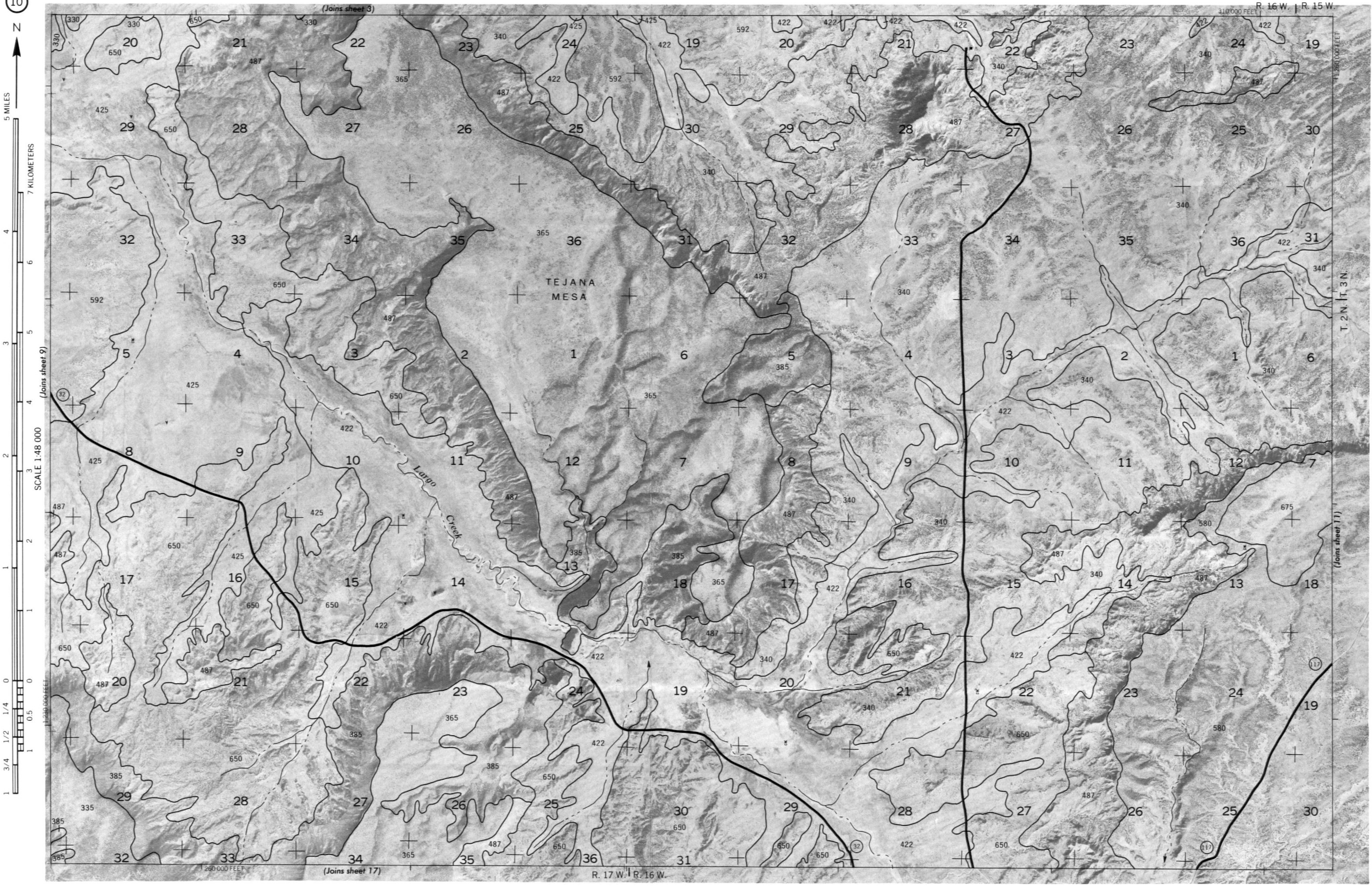

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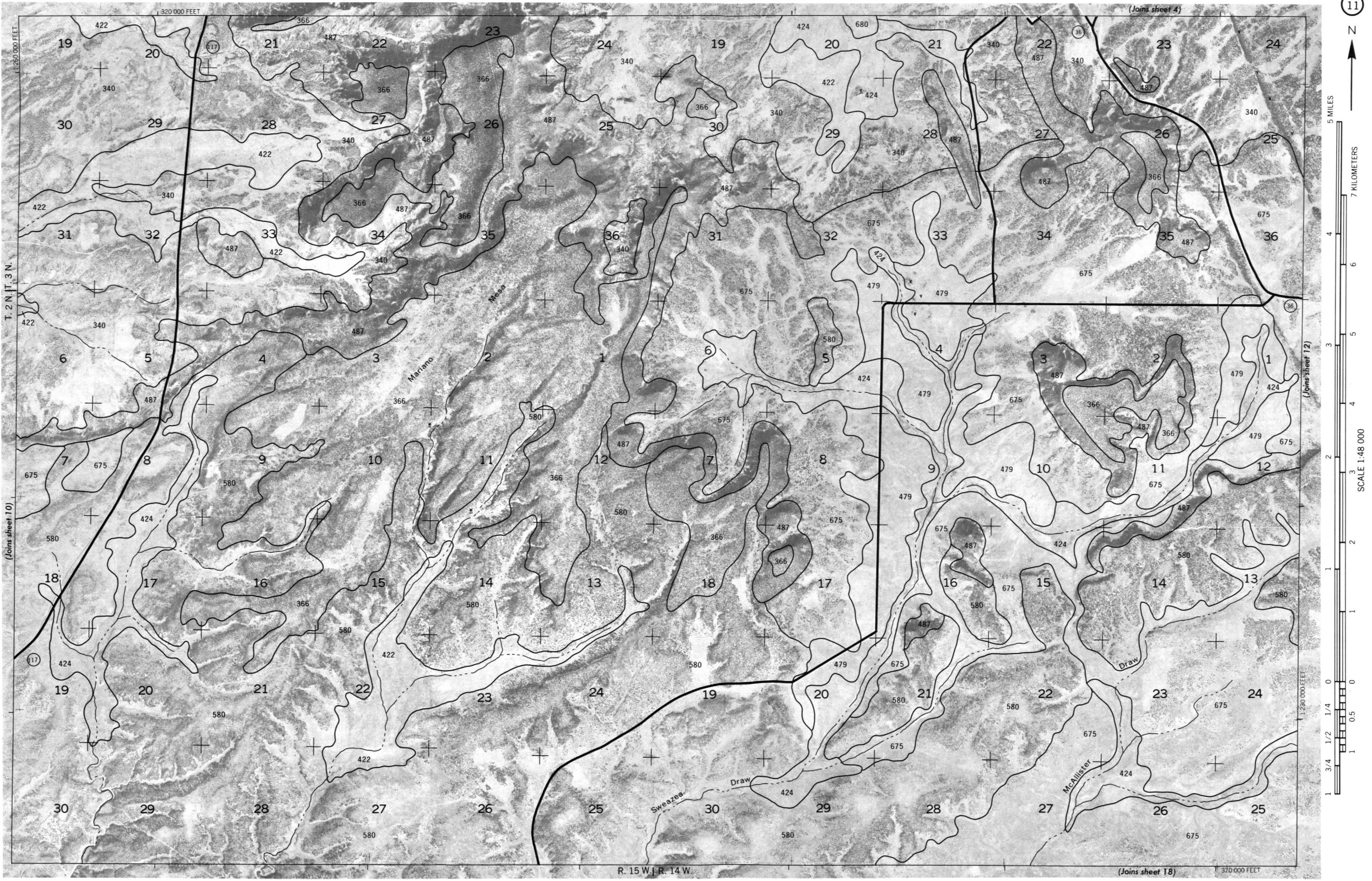

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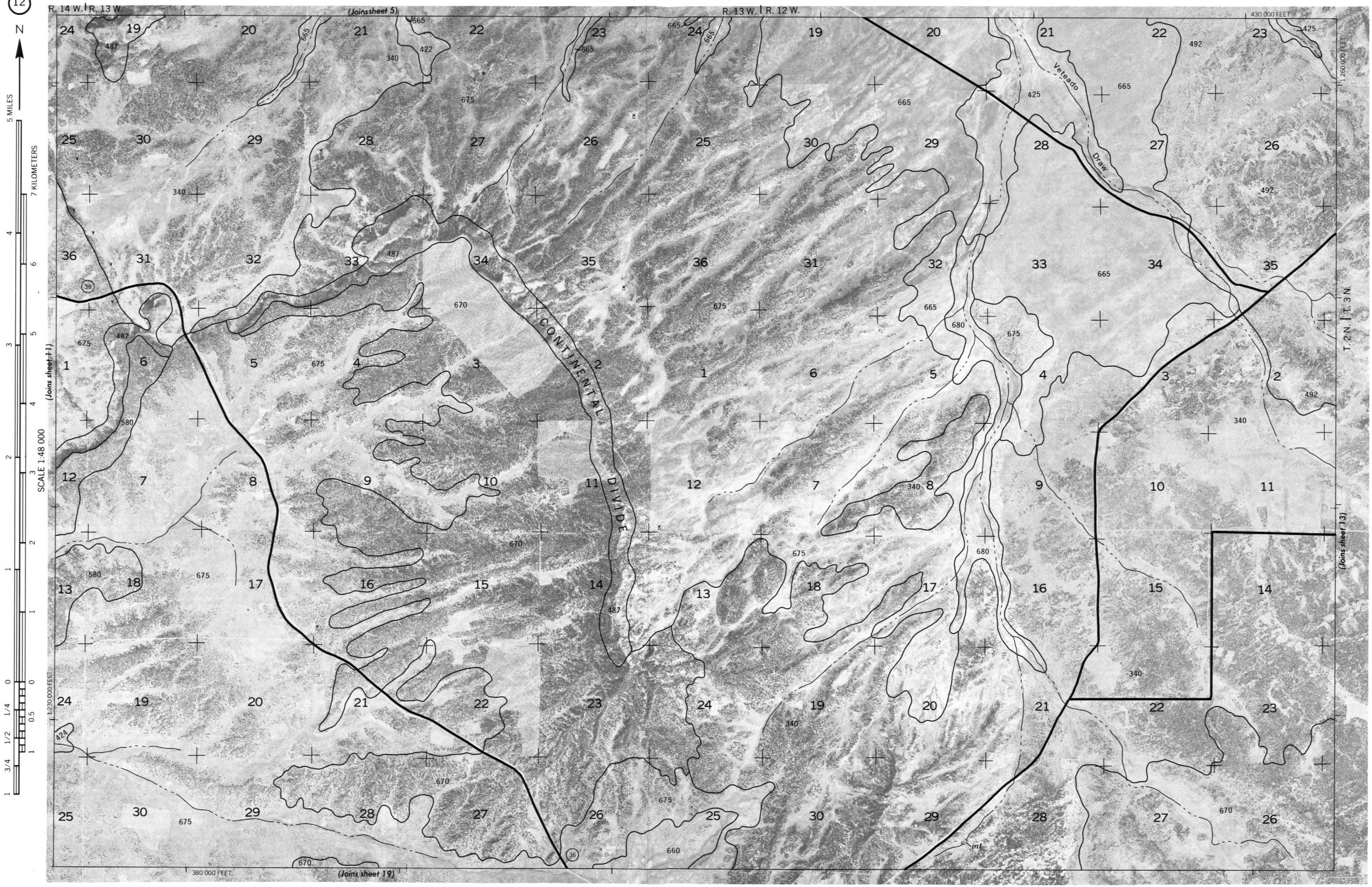

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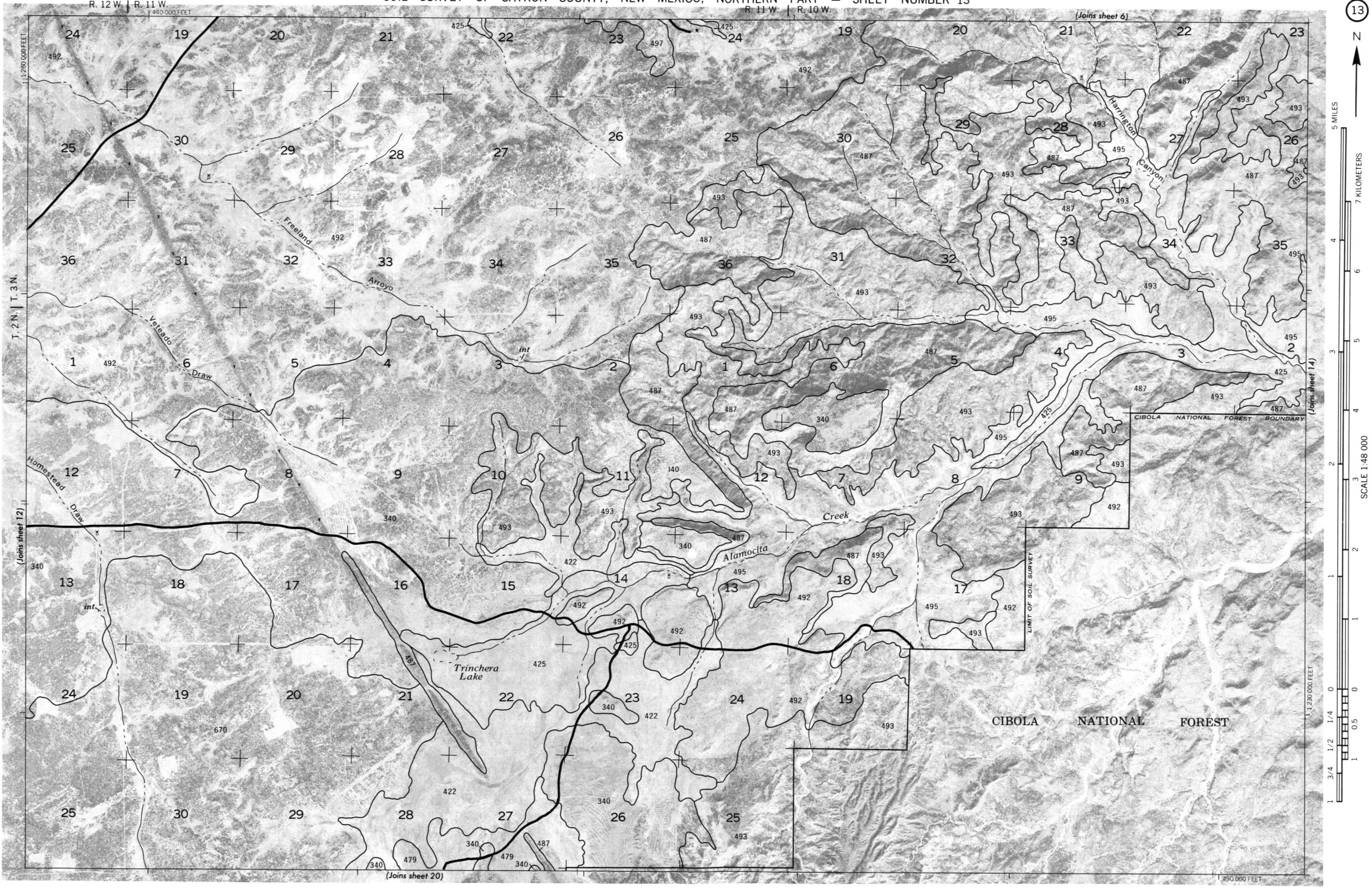
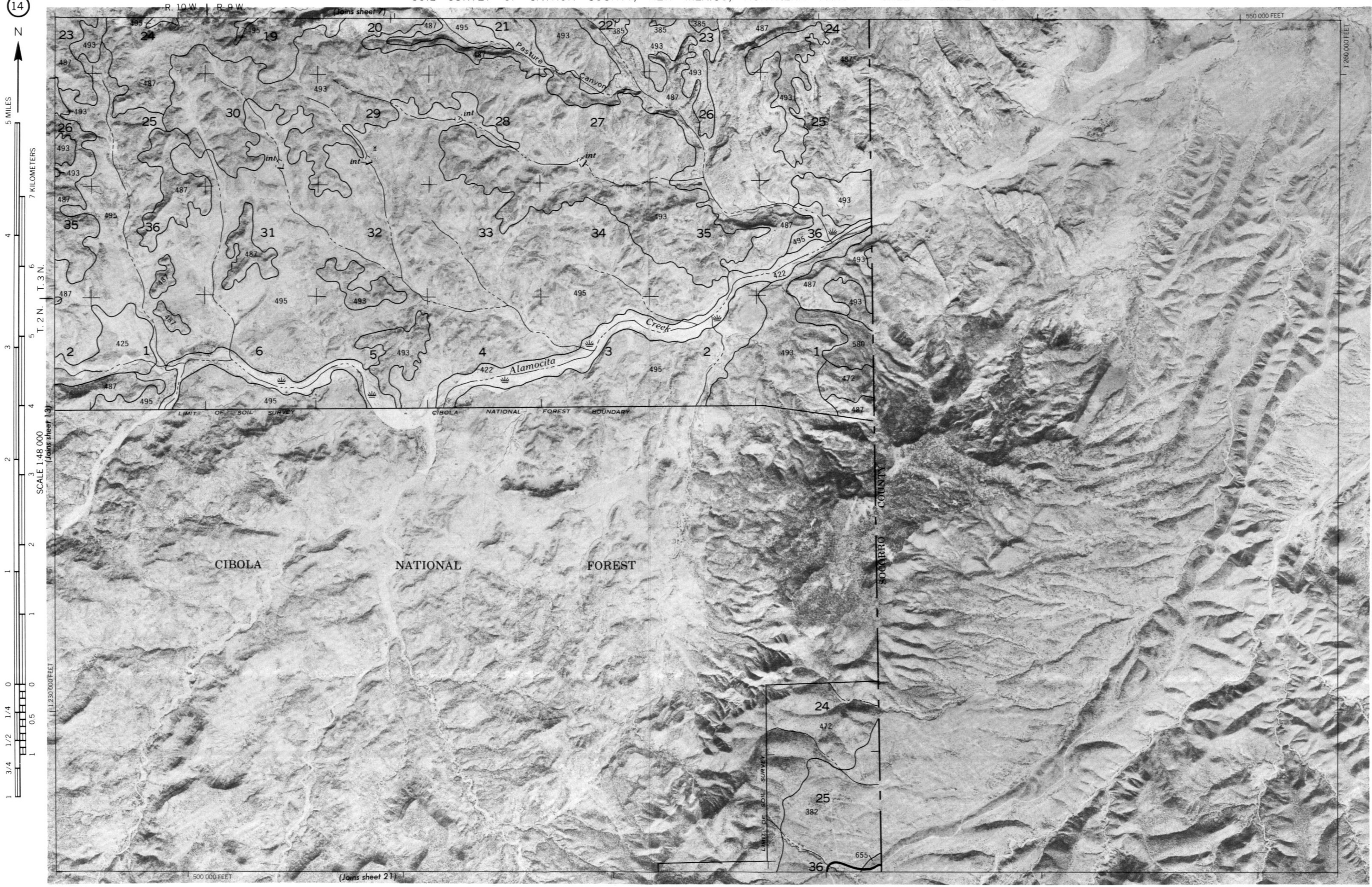


⑭ SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 14



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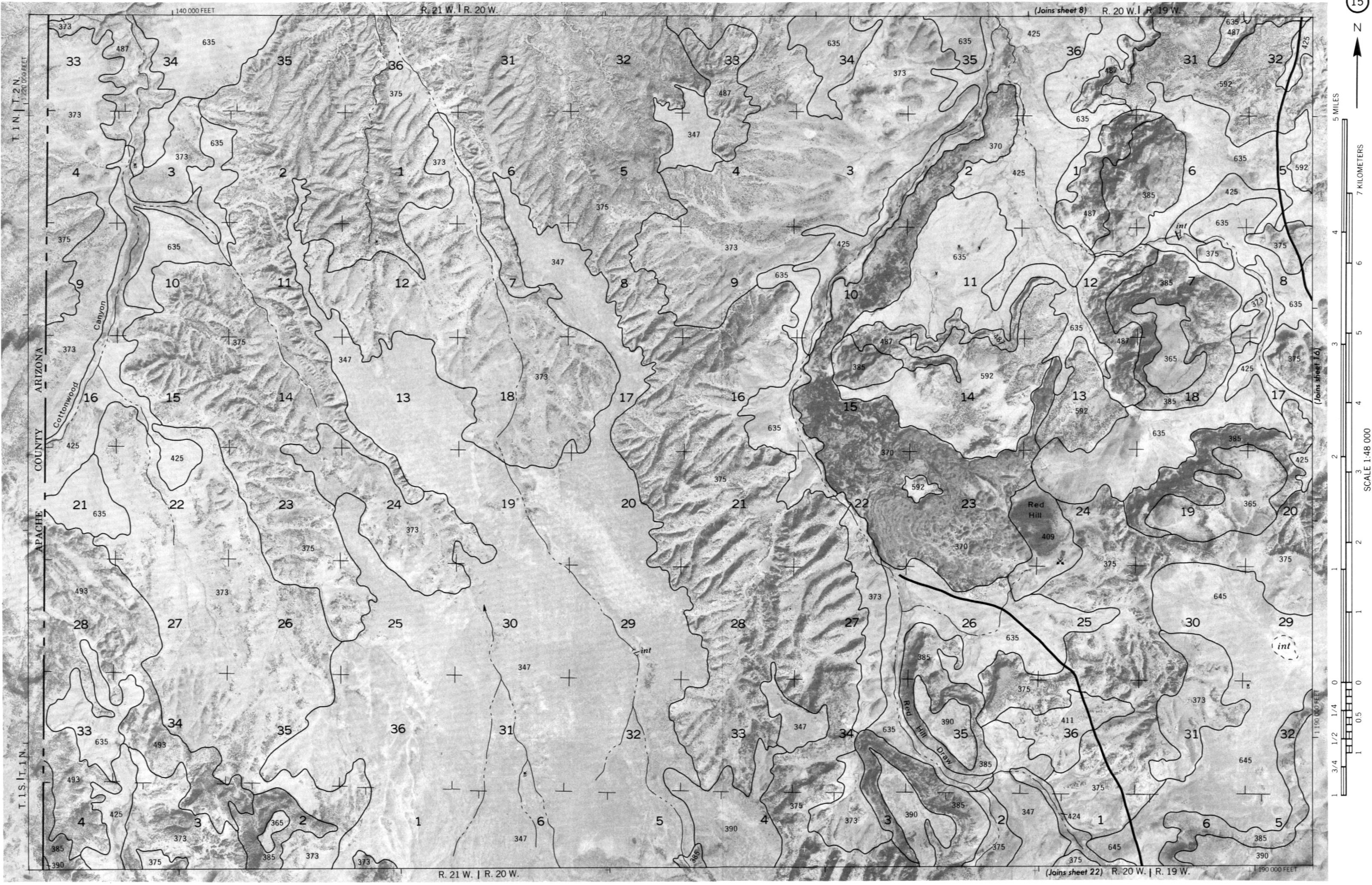

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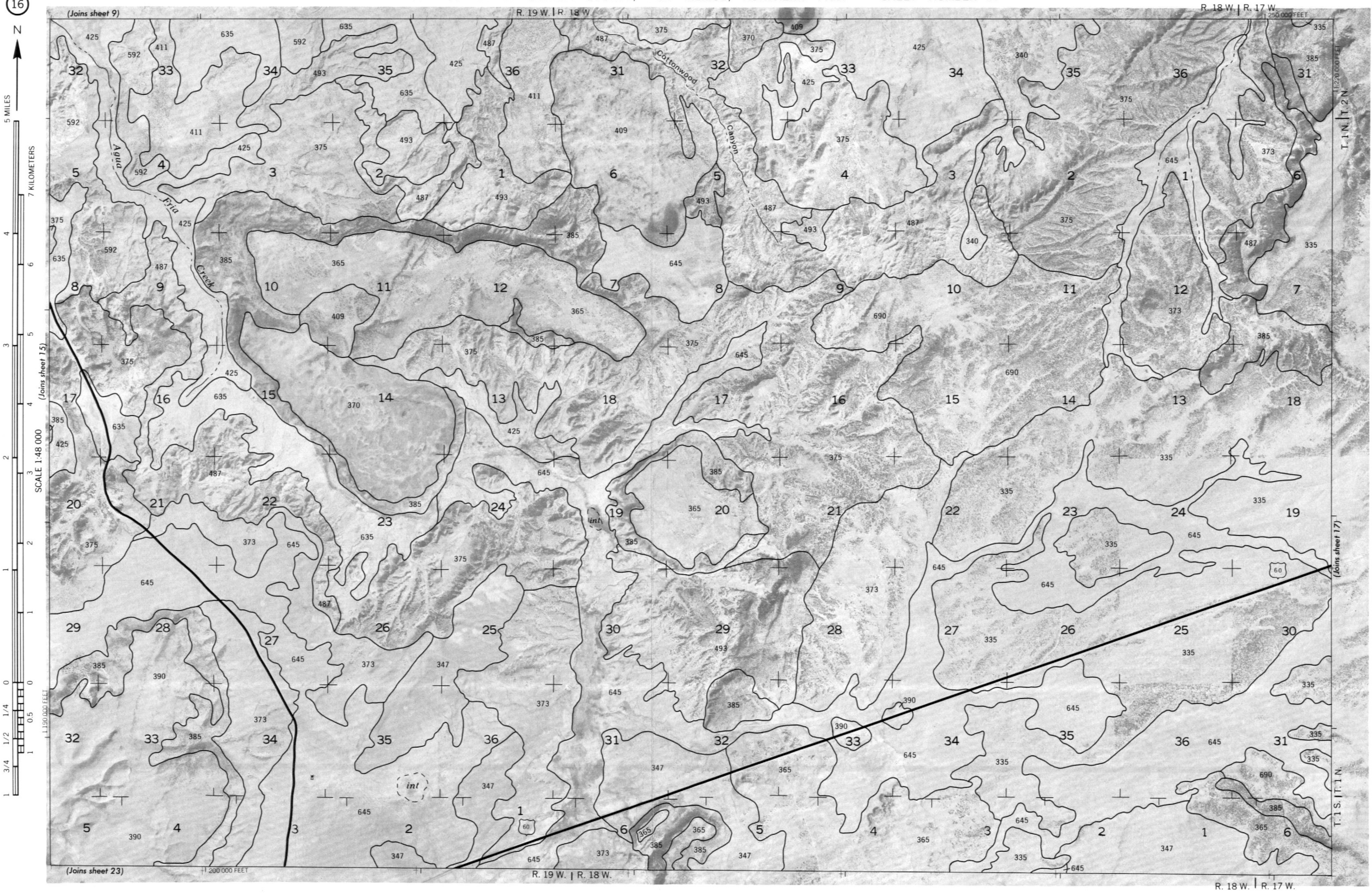

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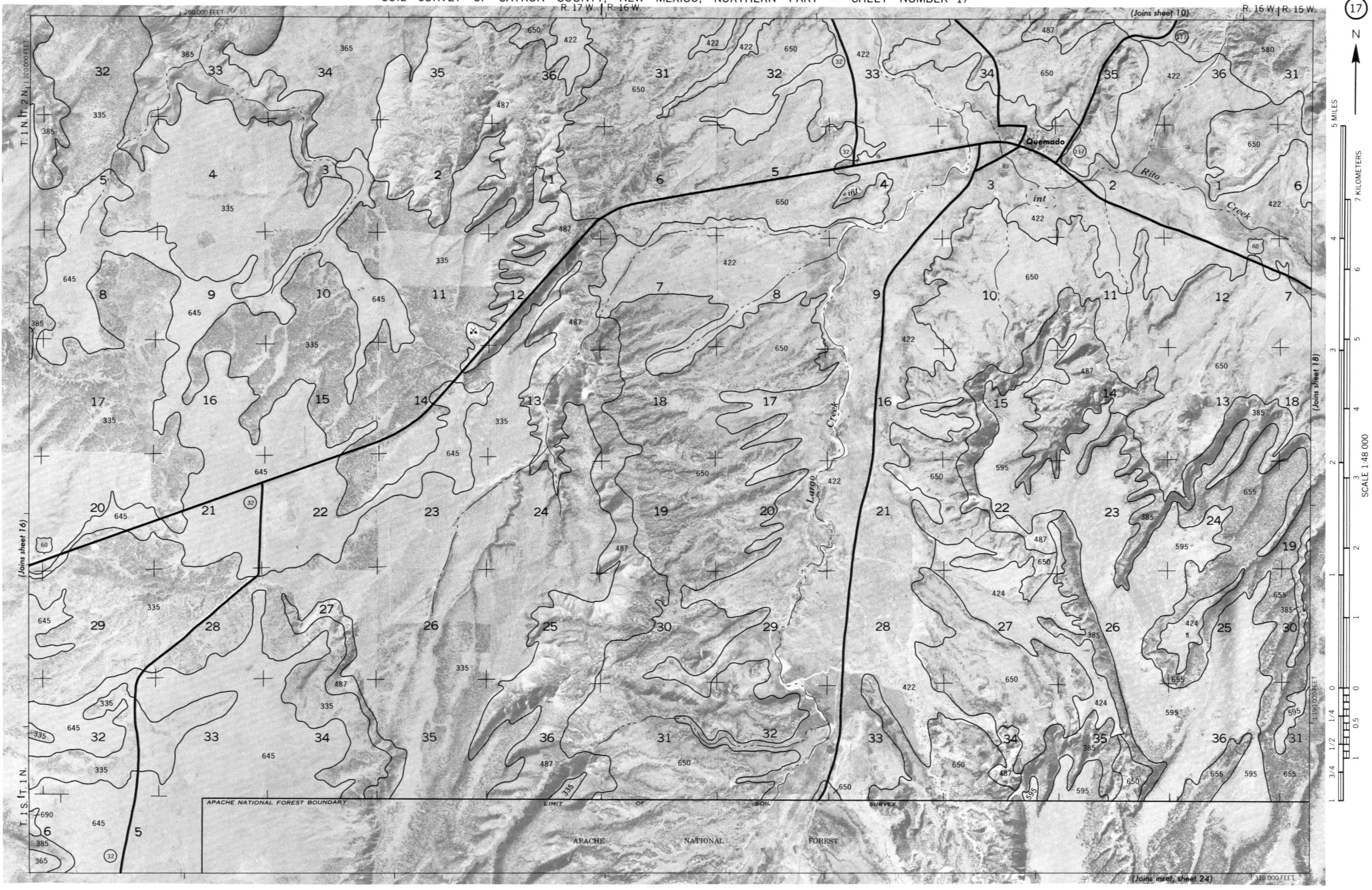
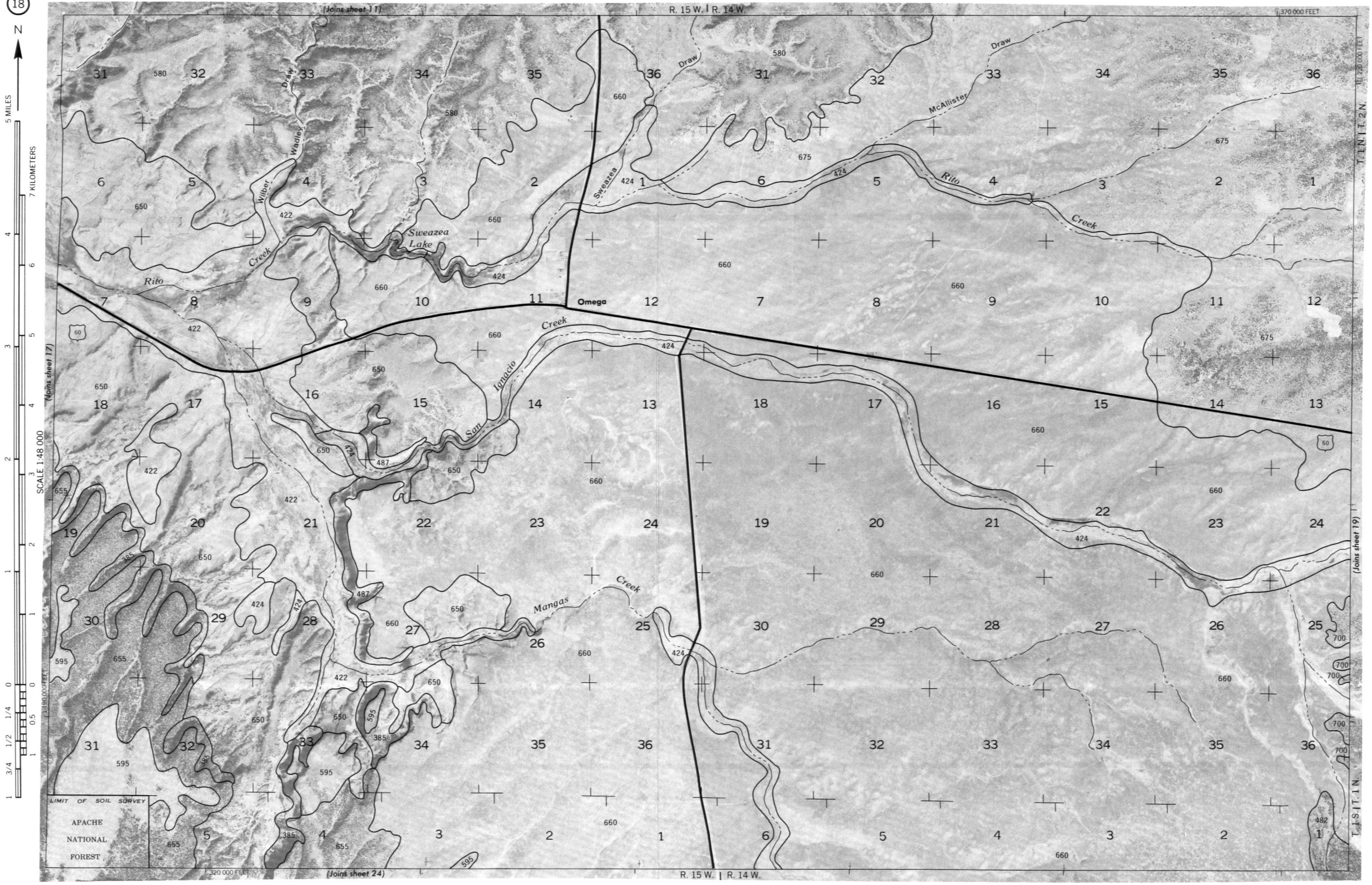
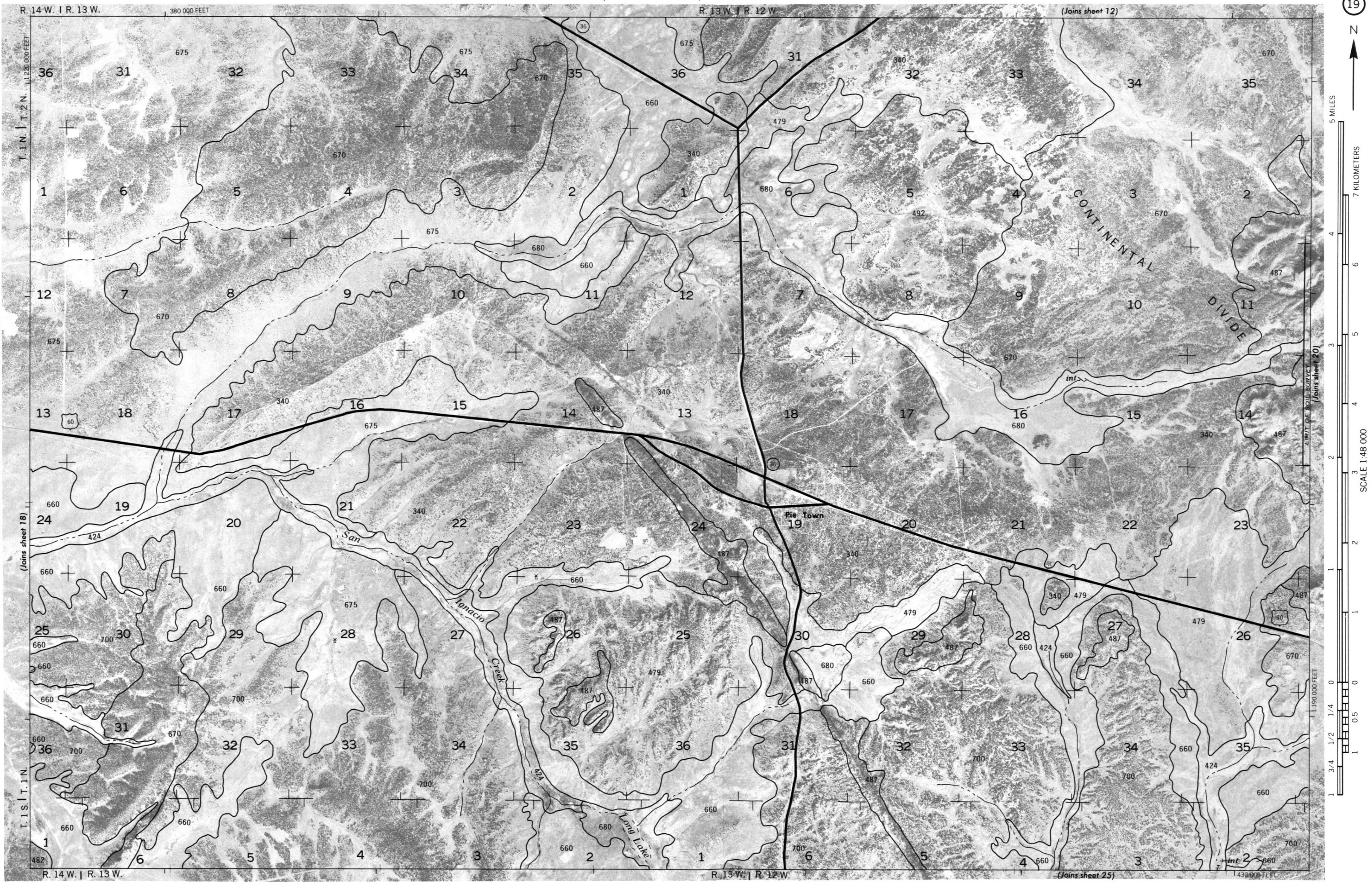



N
5 MILES
7 KILOMETERS
SCALE 1:48 000
(Joins sheet 11)
R. 15 W. | R. 14 W.
1 370 000 FEET
1 230 000 FEET
T. 2 N.
T. 1 N.
T. 1 S.
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 24)
320 000 FEET
1 190 000 FEET
Wadley Draw
Wilber
Sweazea
Sweazea Lake
Rito Creek
McAllister Draw
Draw
Omega
San Ignacio Creek
Mangas Creek
60
LIMIT OF SOIL SURVEY
APACHE NATIONAL FOREST
580
660
675
650
422
424
487
655
385
595
700
482

SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 19



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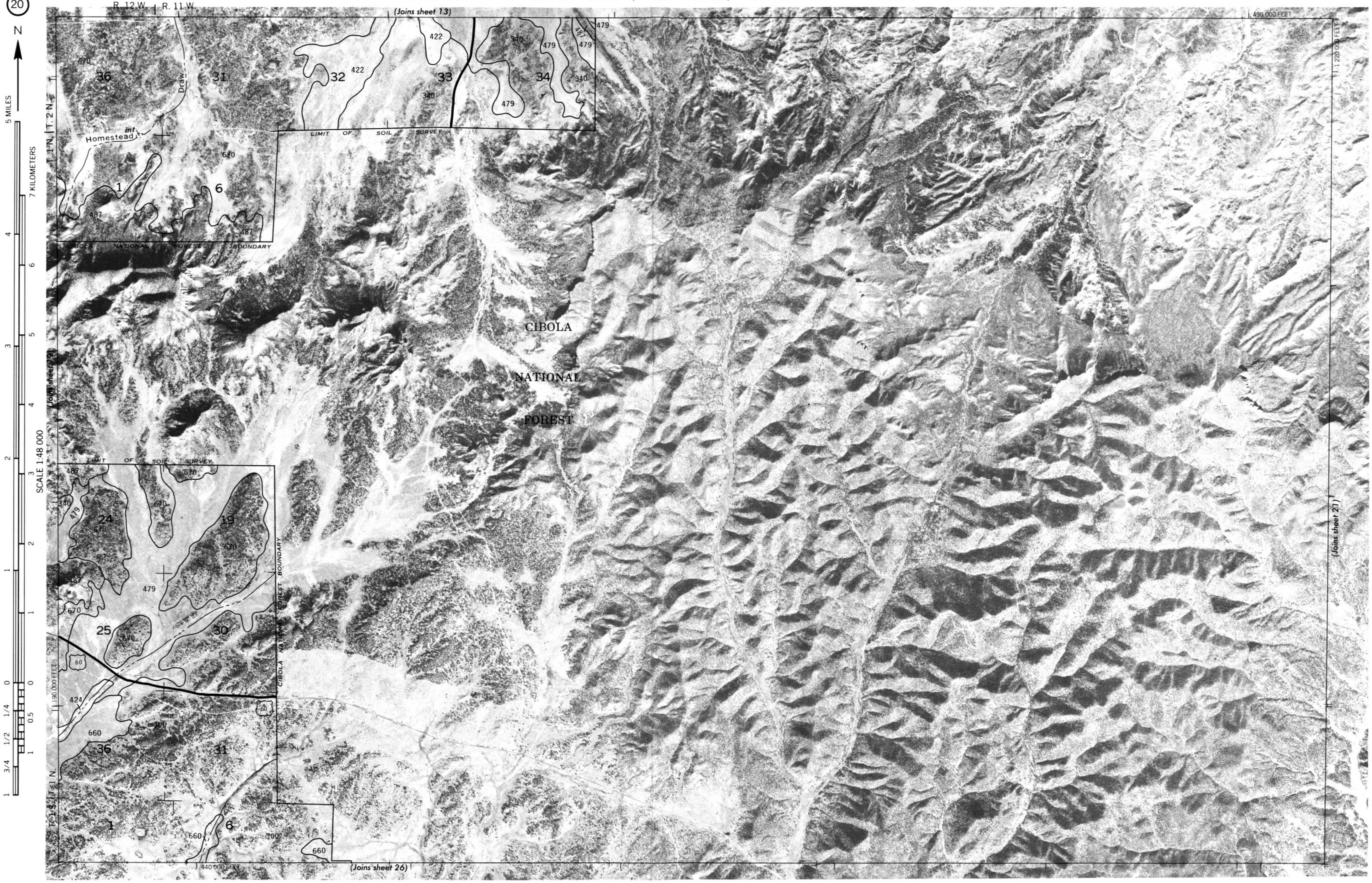

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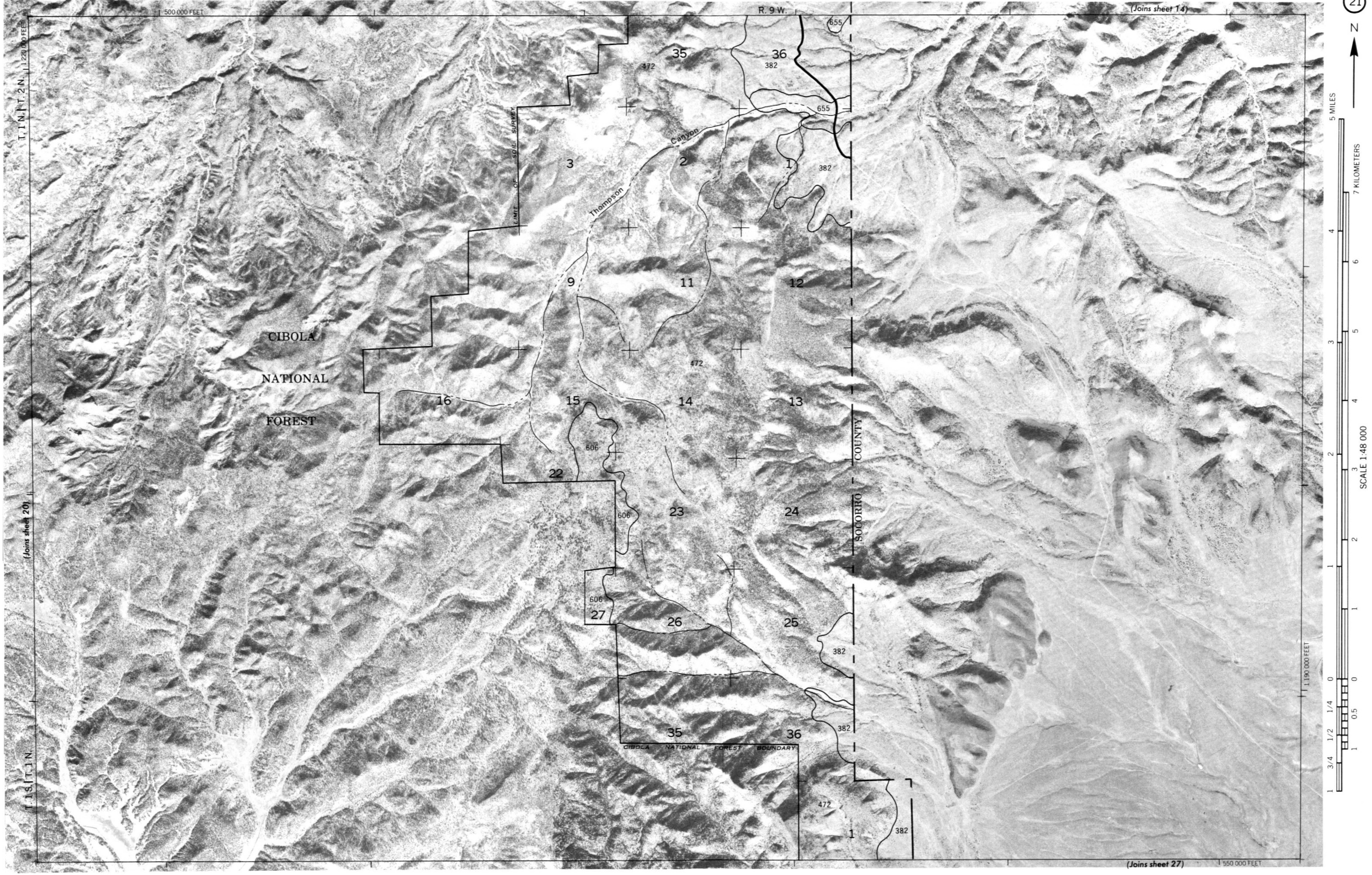

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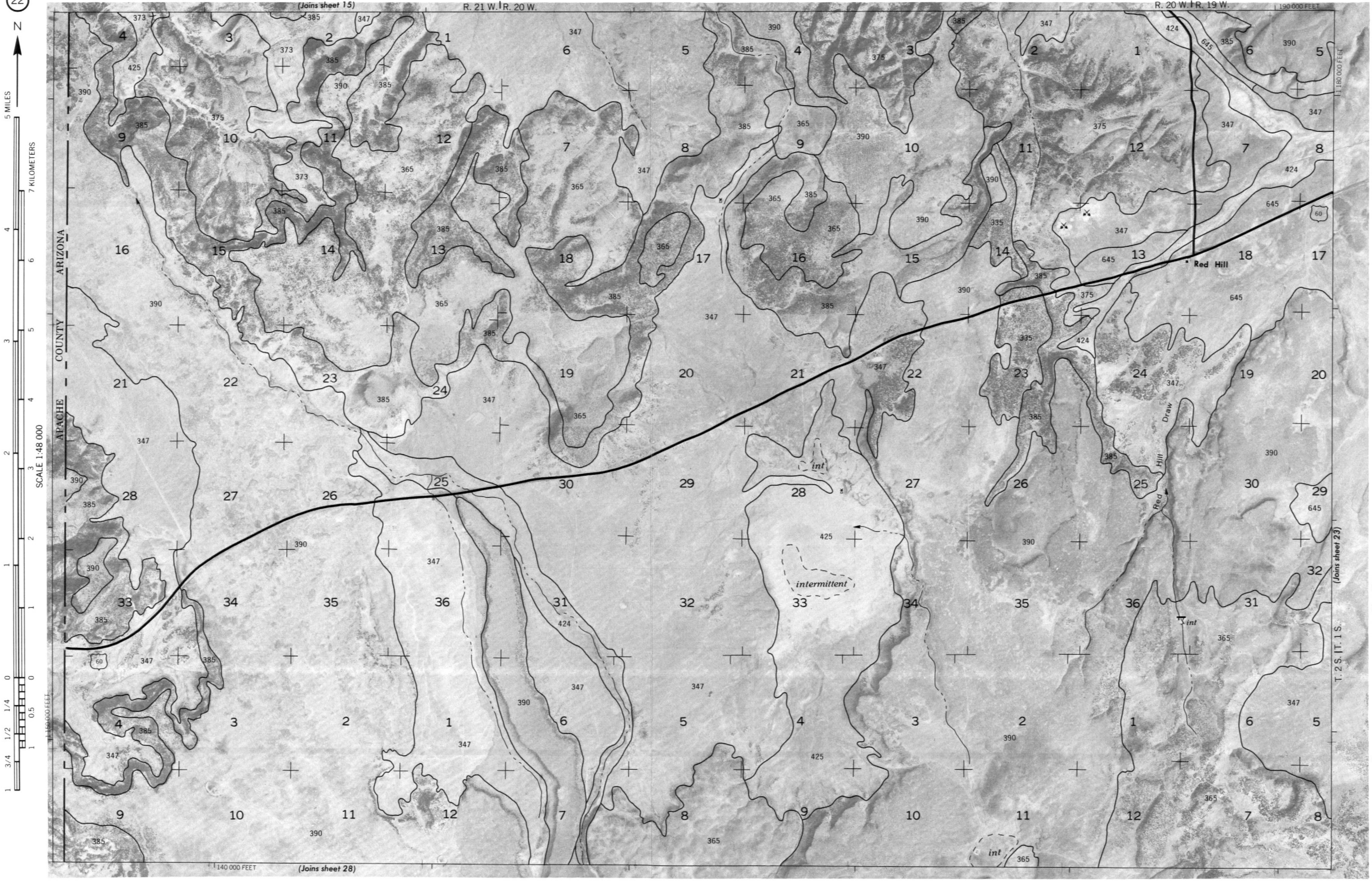
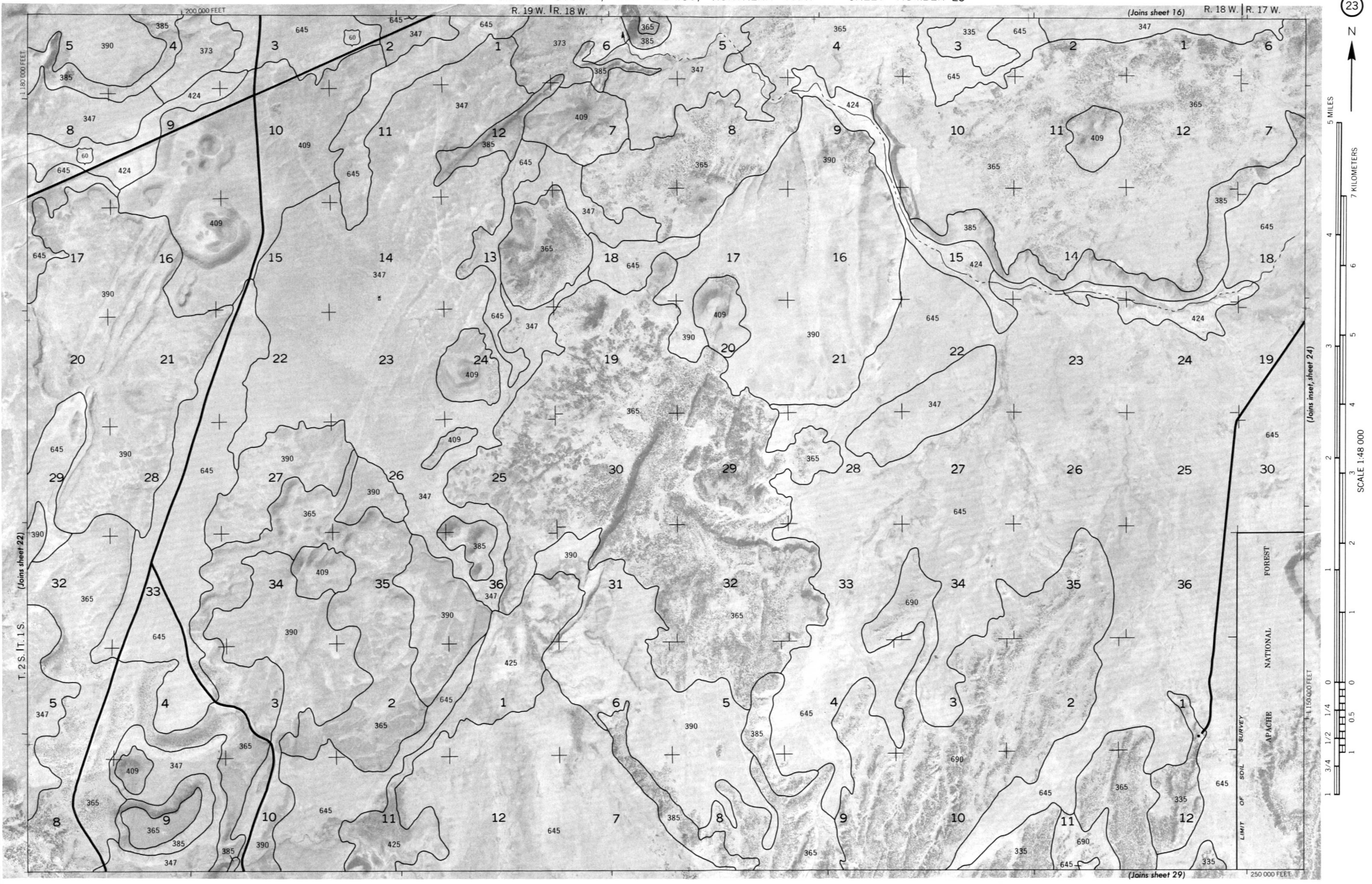
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 22




23
N
200 000 FEET
R. 19 W. | R. 18 W.
(Joins sheet 16)
R. 18 W. | R. 17 W.
1 180 000 FEET
(Joins sheet 22)
T. 2 S. | T. 1 S.
(Joins inset, sheet 24)
(Joins sheet 29)
250 000 FEET
1 150 000 FEET
60
5 MILES
7 KILOMETERS
SCALE 1:48 000
0
1/4
1/2
3/4
1
2
3
4
5
6
7
LIMIT OF SOIL SURVEY
APACHE NATIONAL FOREST
5
390
385
4
373
3
645
2
347
1
373
6
365
335
12
409
7
8
9
10
11
424
13
14
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16
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19
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21
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23
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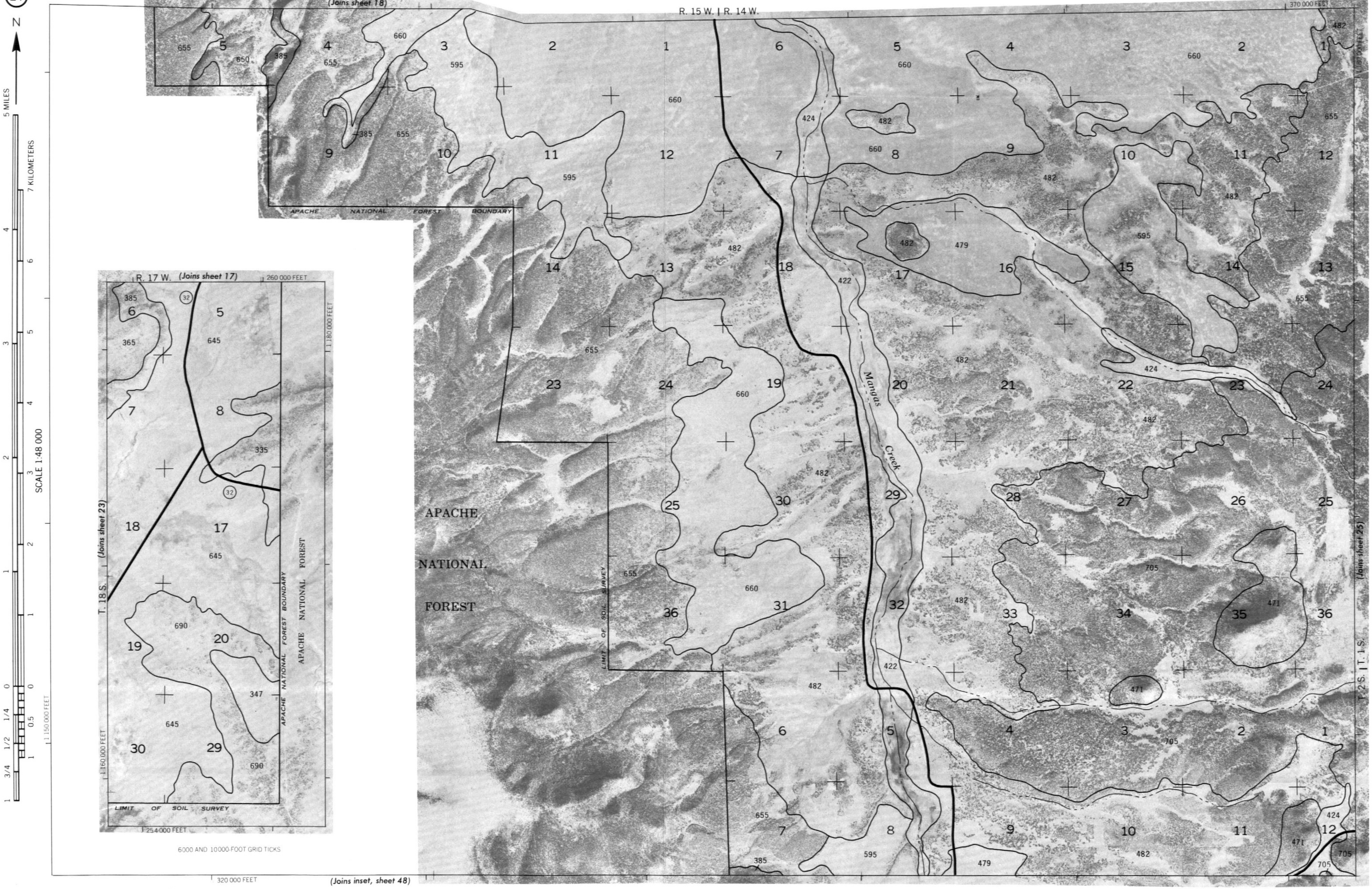
33
34
35
36
425
690

(24)

SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 24



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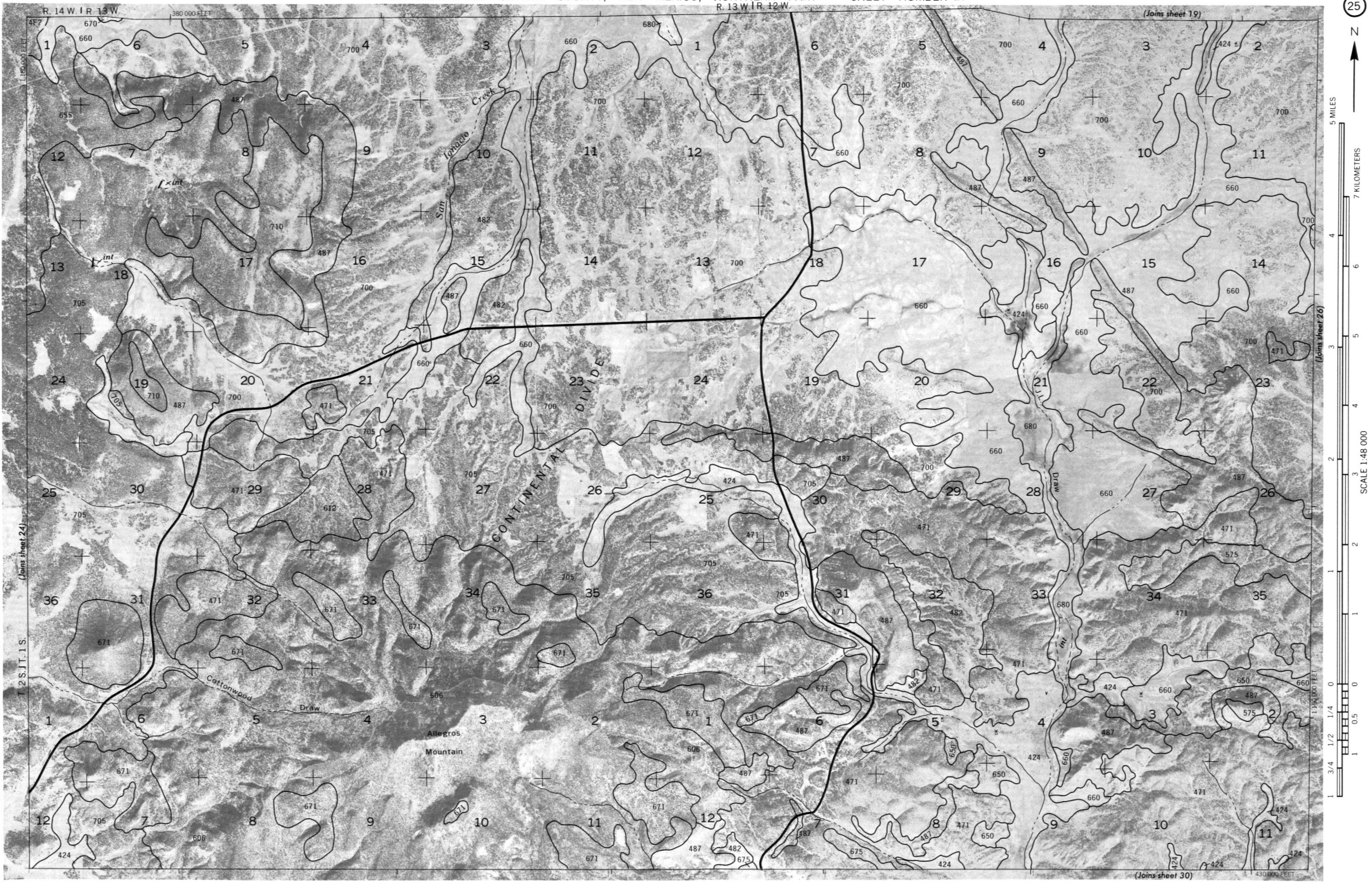

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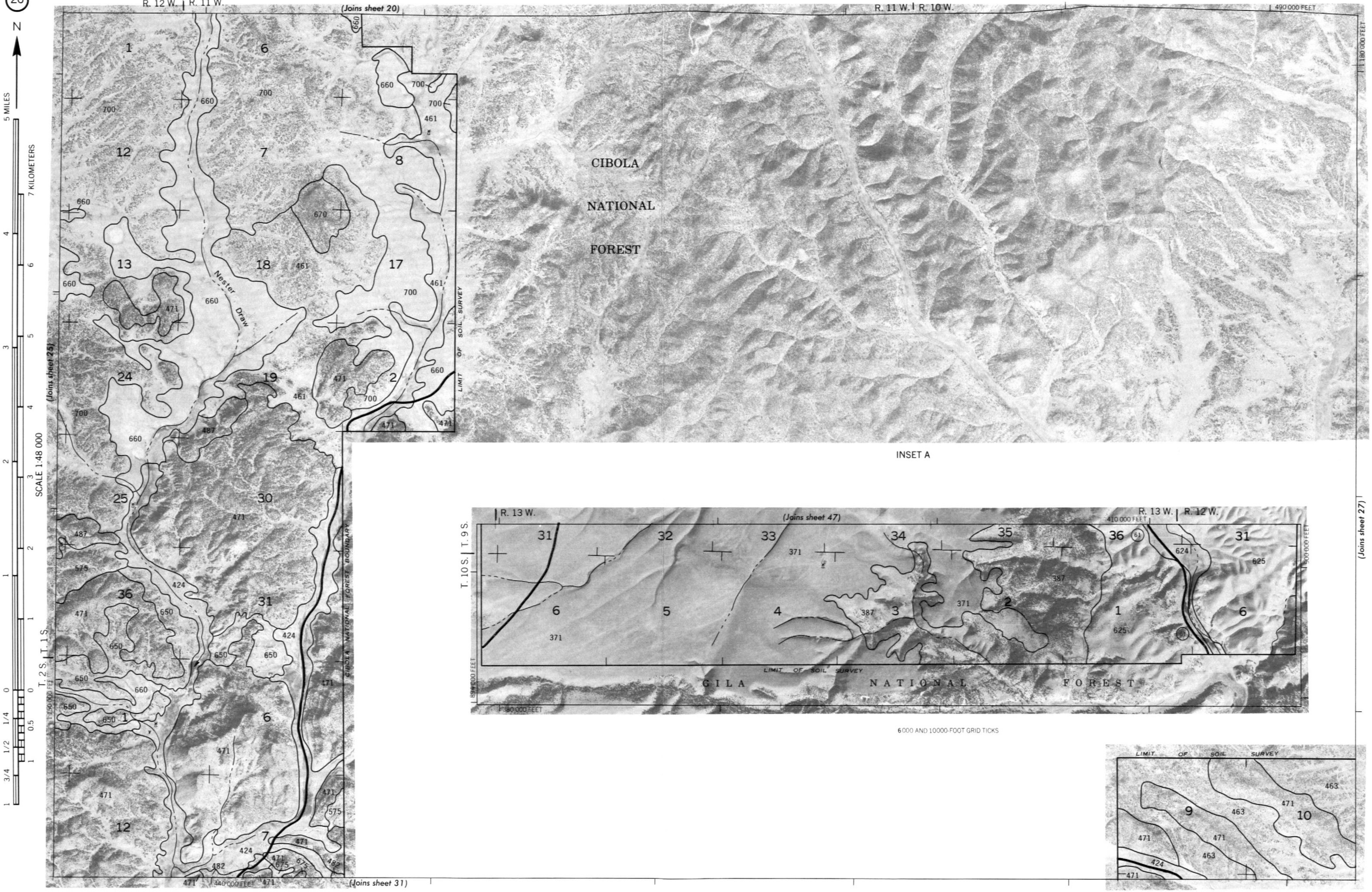

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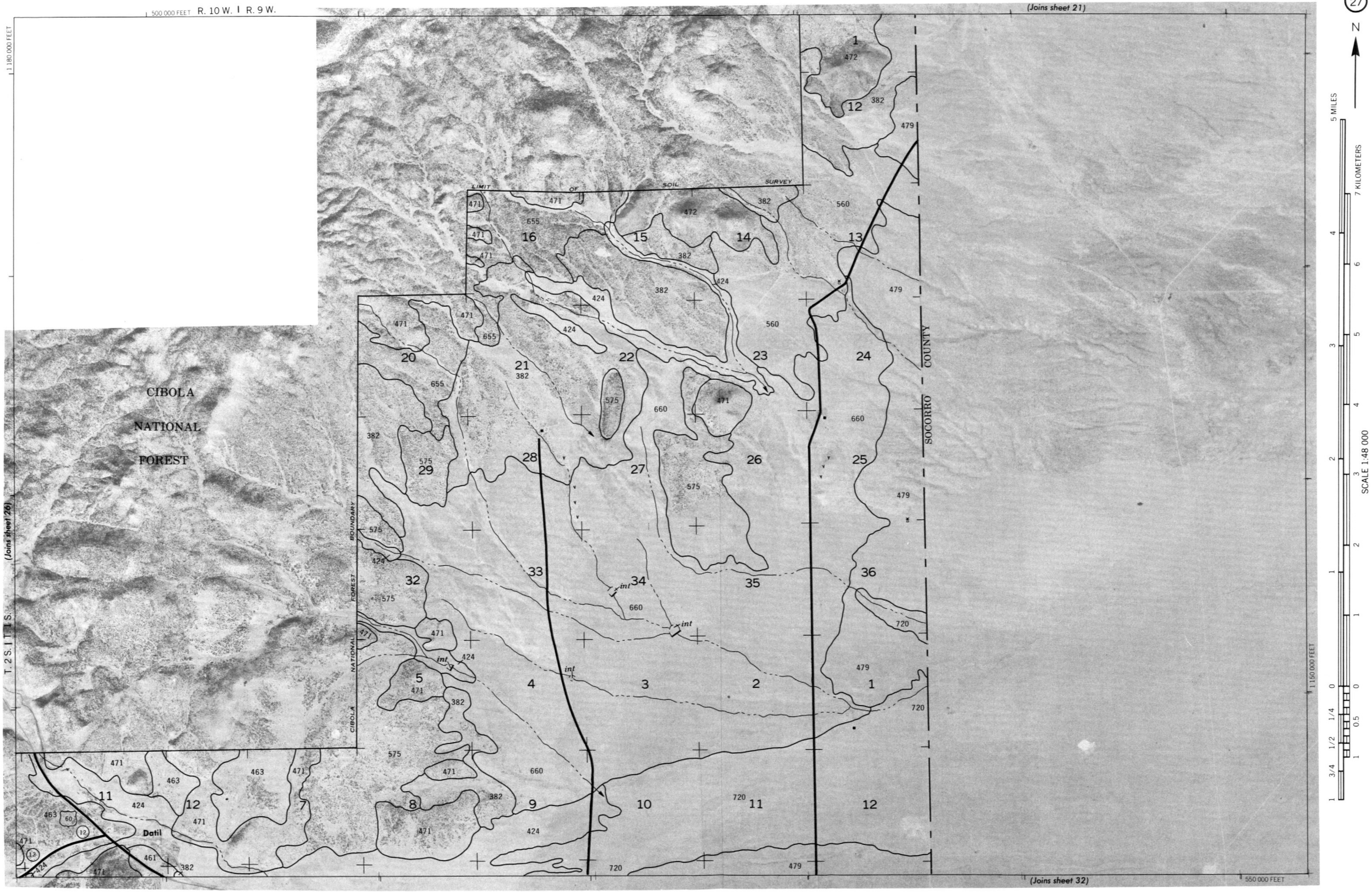

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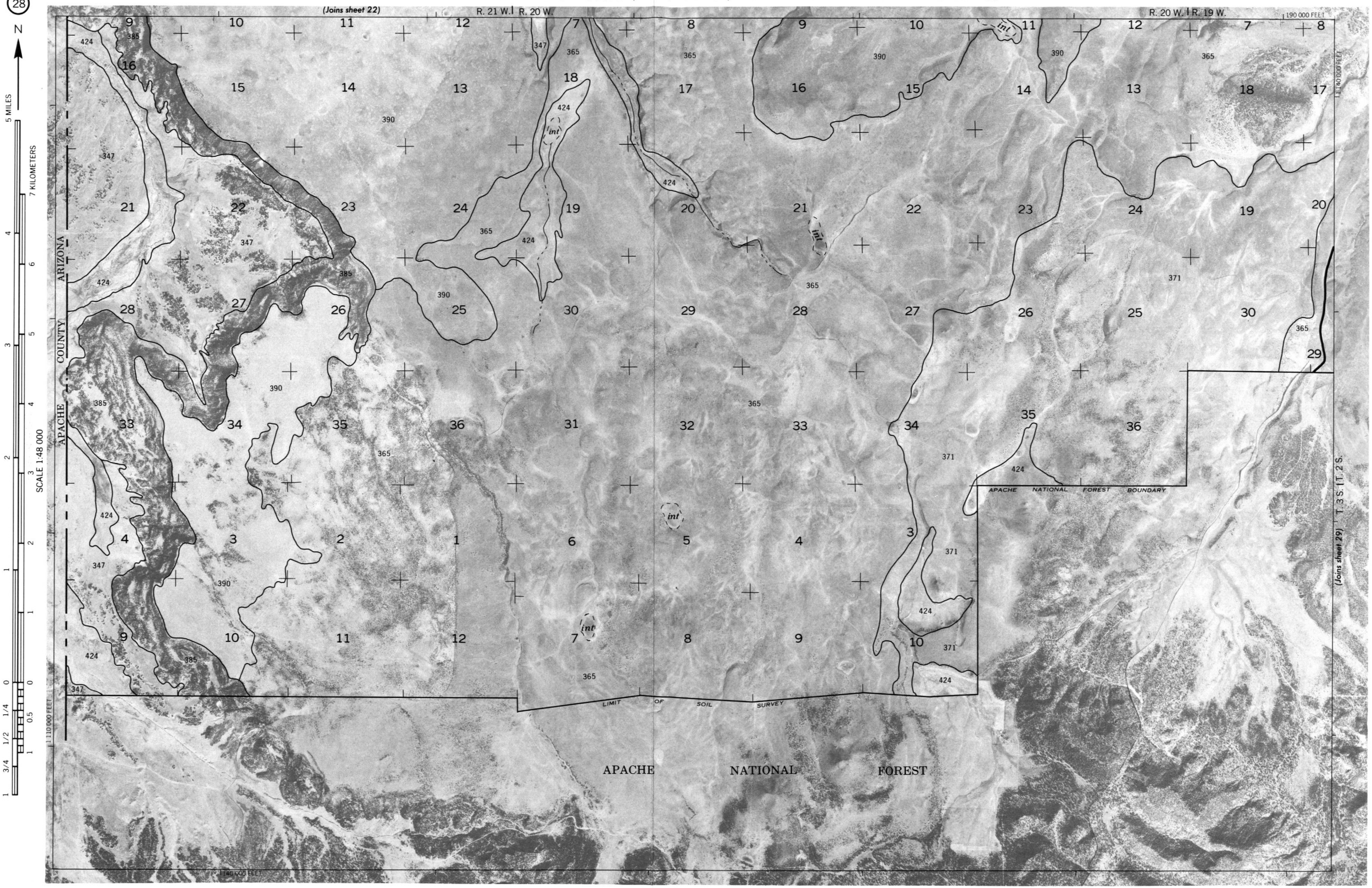
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 28



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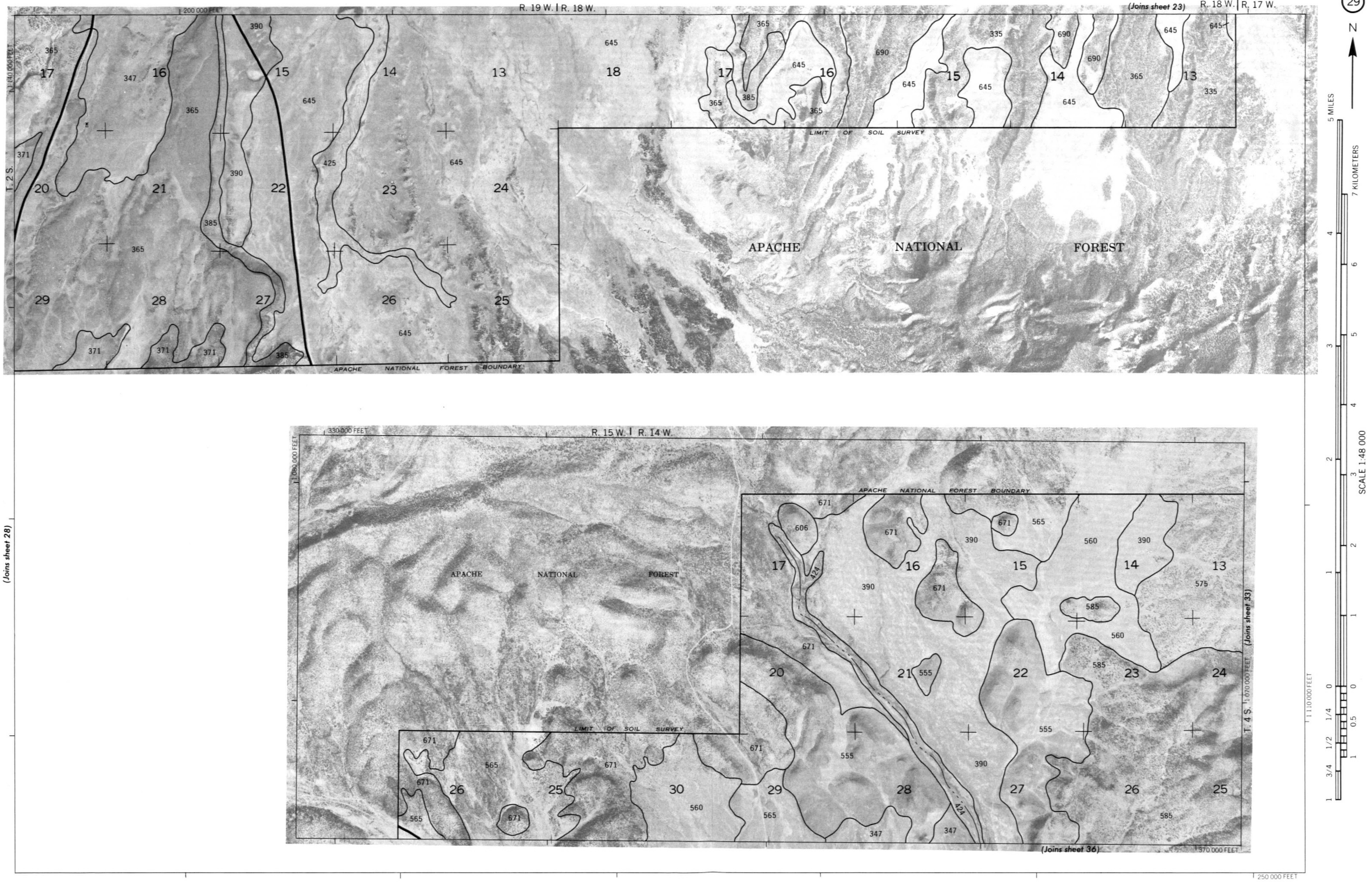
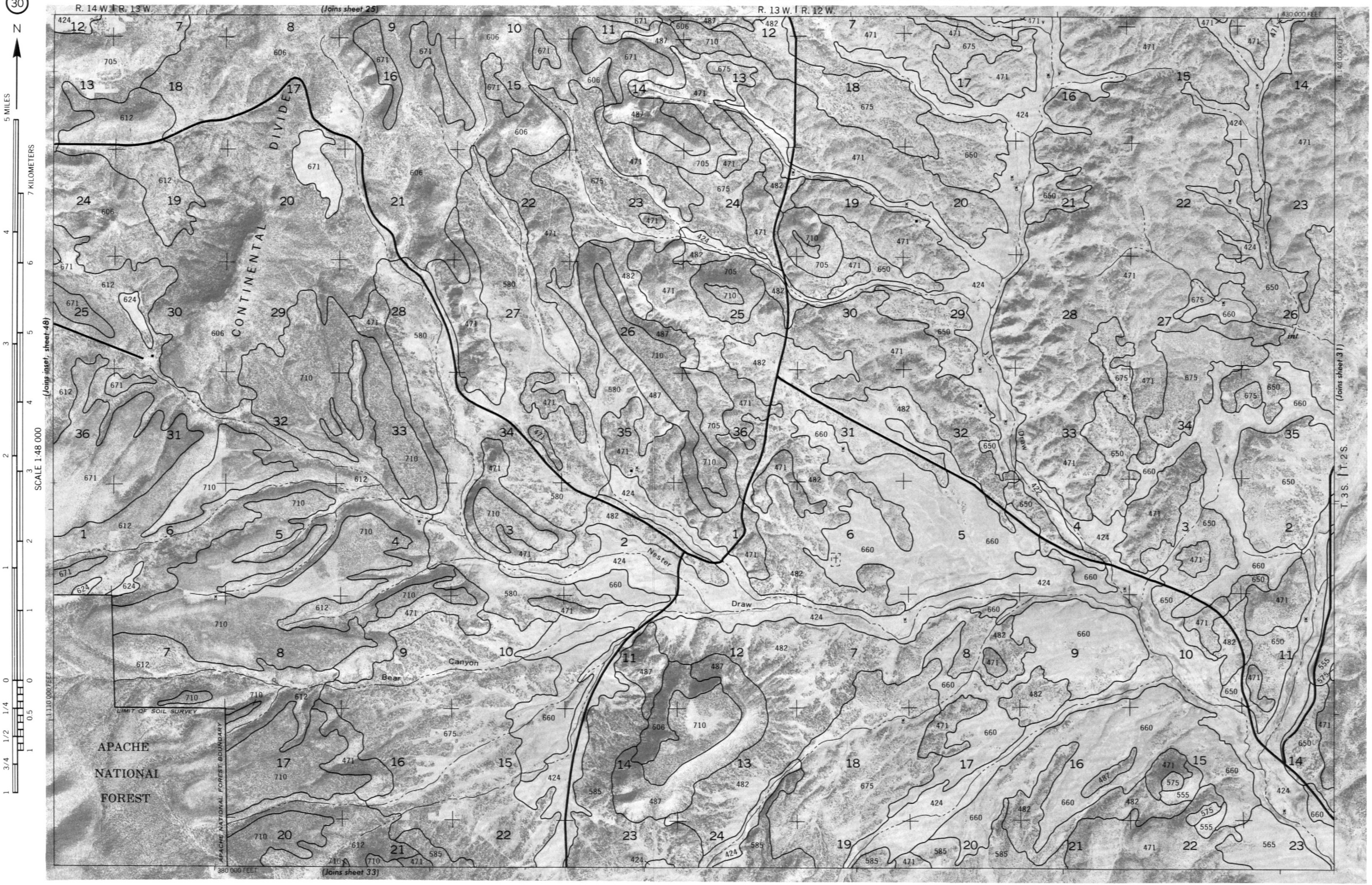
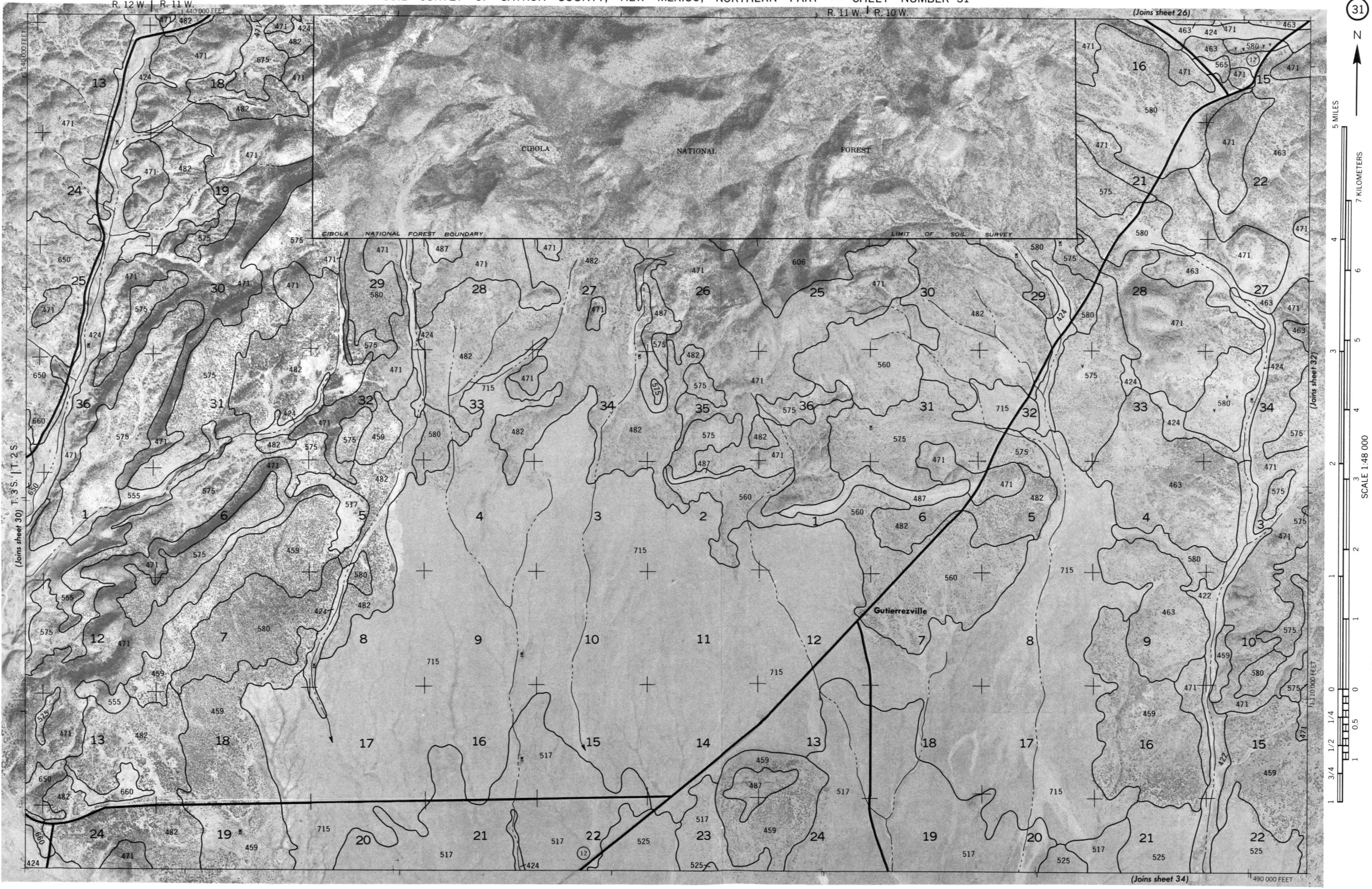



30
N
R. 14 W. | R. 13 W.
(Joins sheet 25)
R. 13 W. | R. 12 W.
430 000 FEET
1 140 000 FEET
(Joins inset, sheet 48)
(Joins sheet 31)
T. 3 S. | T. 2 S.
(Joins sheet 33)
380 000 FEET
1 110 000 FEET
CONTINENTAL DIVIDE
Nester Draw
Bear Canyon
Draw
LIMIT OF SOIL SURVEY
APACHE NATIONAL FOREST BOUNDARY
APACHE NATIONAL FOREST
SCALE 1:48 000
5 MILES
7 KILOMETERS

SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 31



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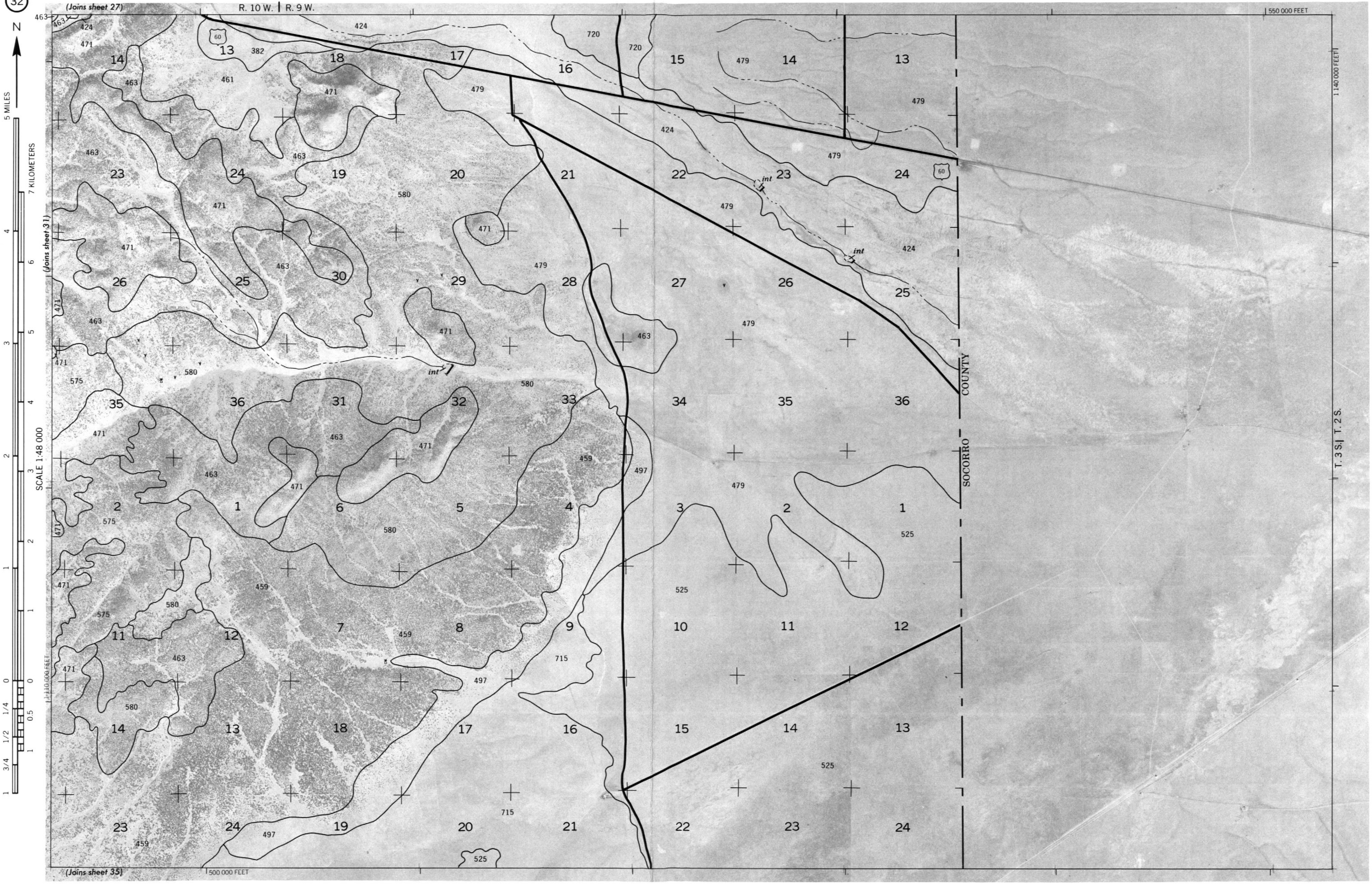
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 32



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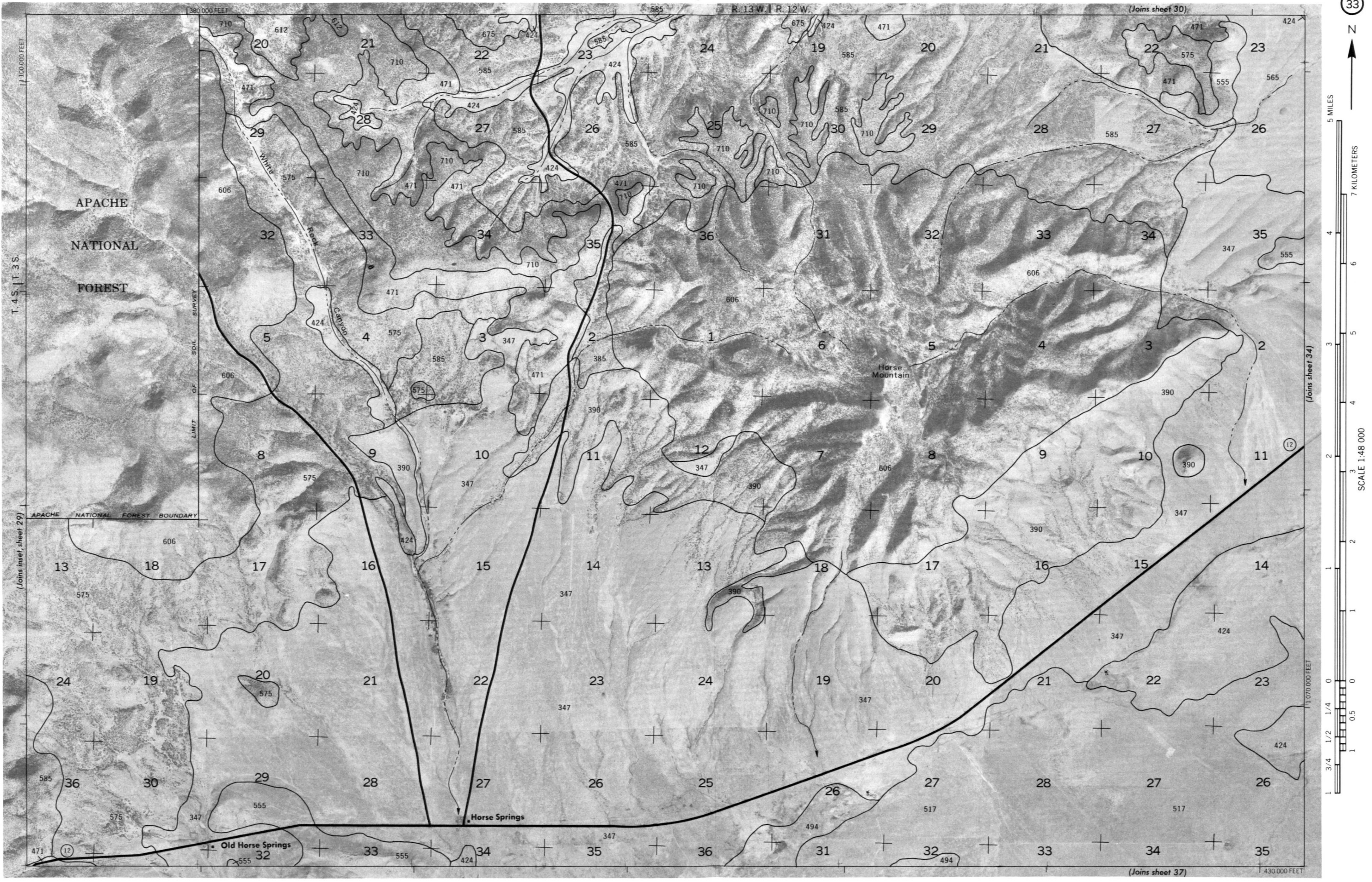

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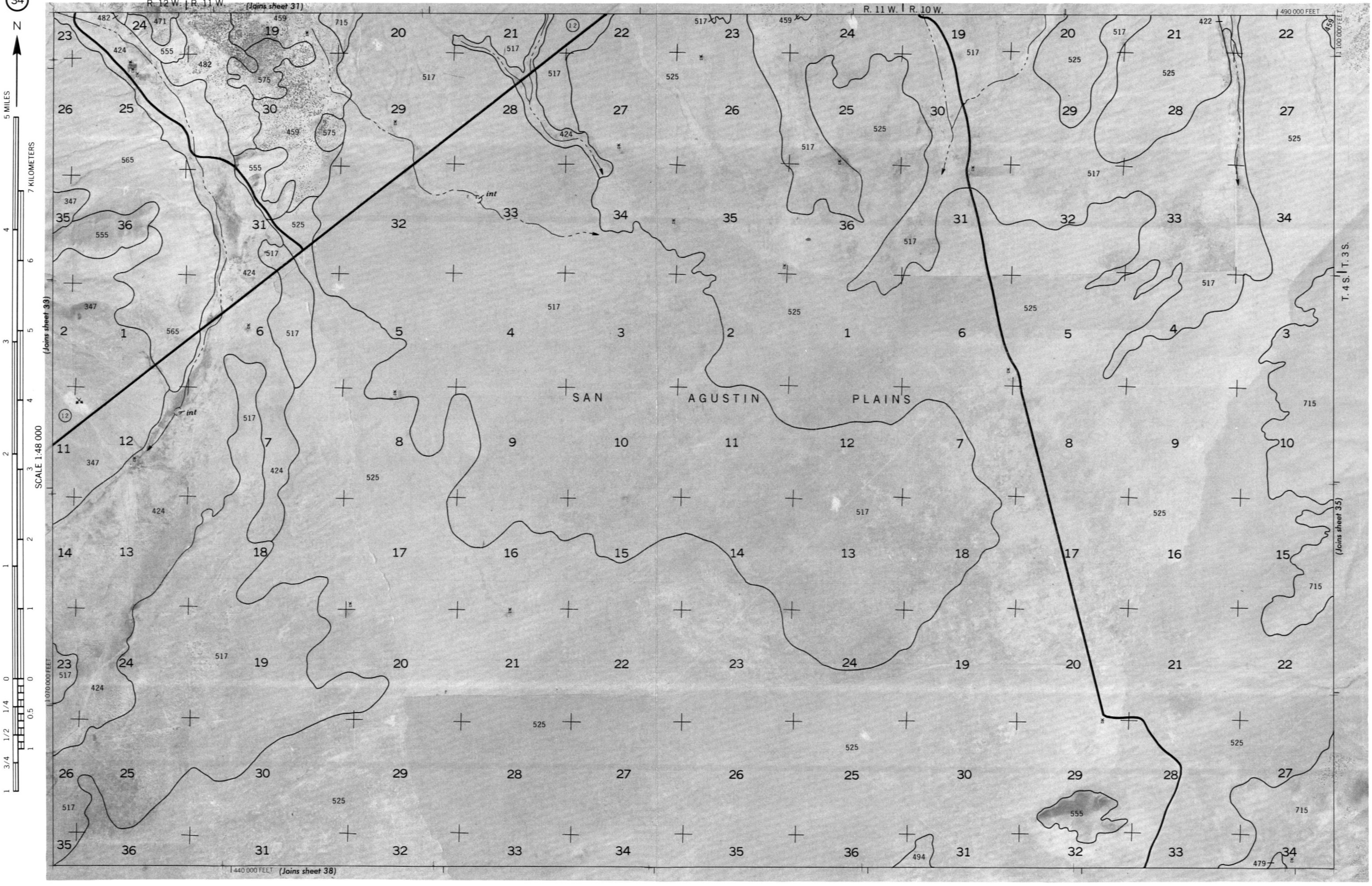

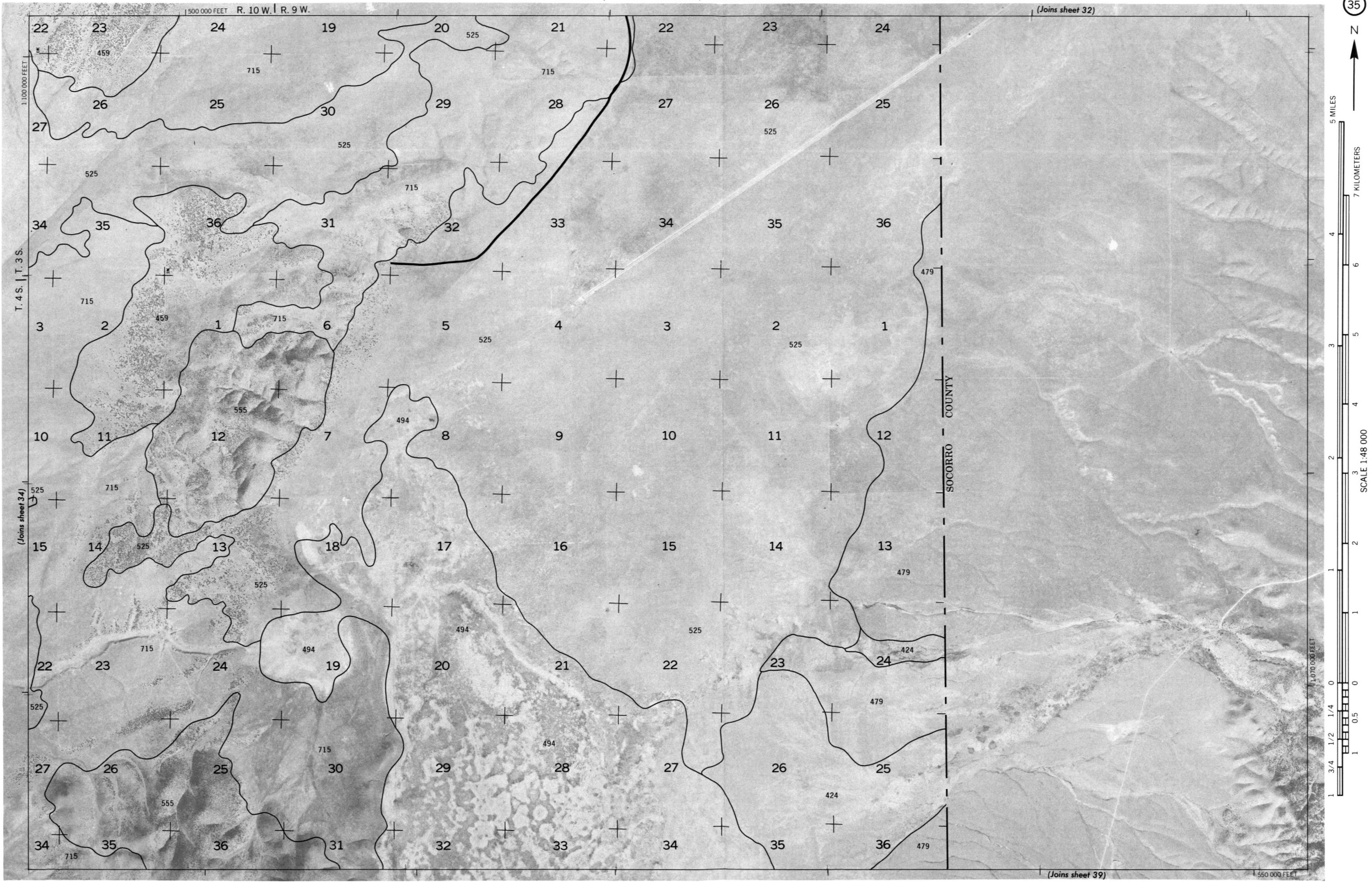
35
N
500 000 FEET
R. 10 W.
R. 9 W.
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 39)
1 100 000 FEET
1 070 000 FEET
550 000 FEET
T. 3 S.
T. 4 S.
SOCORRO COUNTY
5 MILES
7 KILOMETERS
SCALE 1:48 000
0
1/4
1/2
3/4
1
2
3
4
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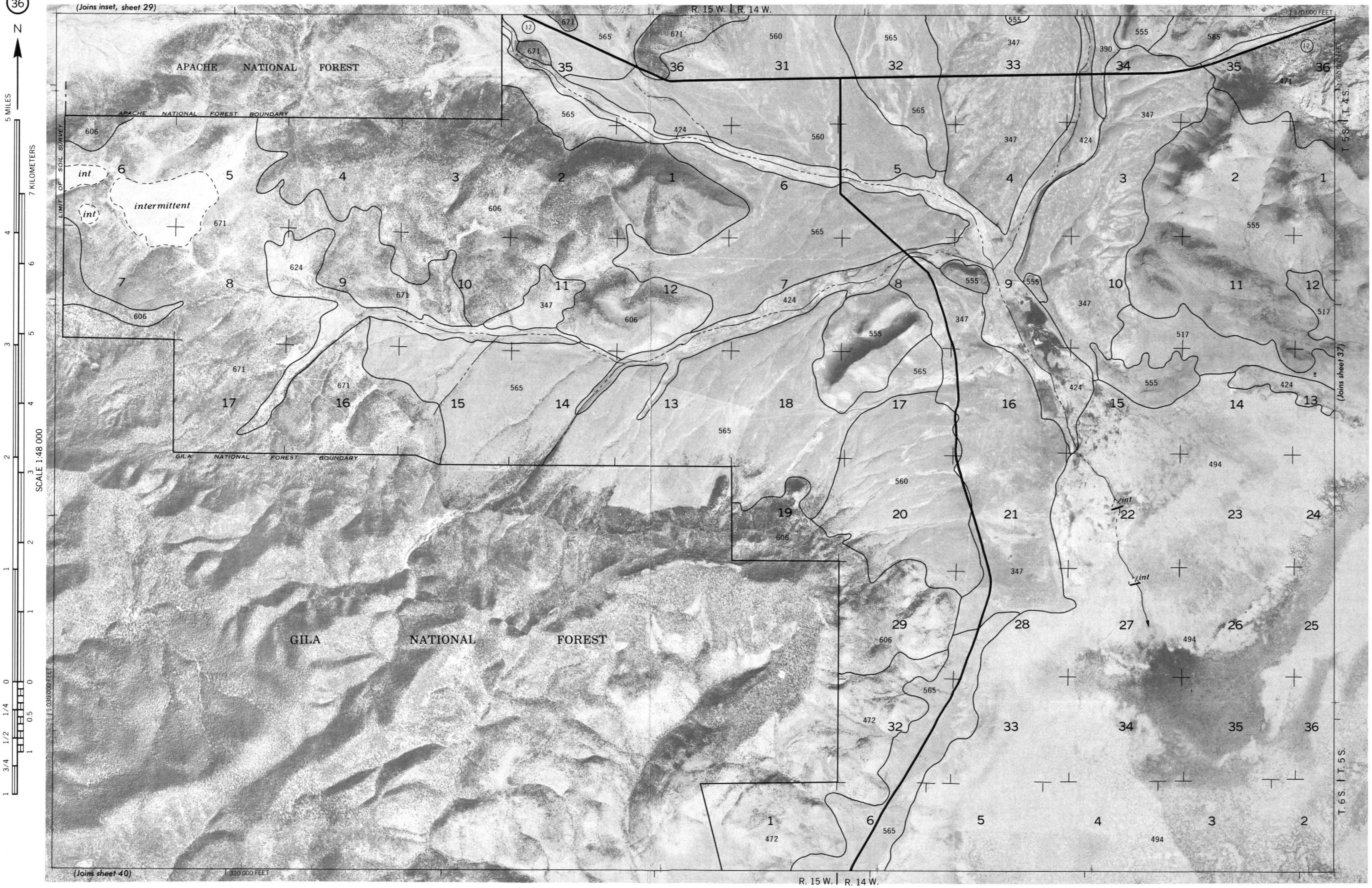
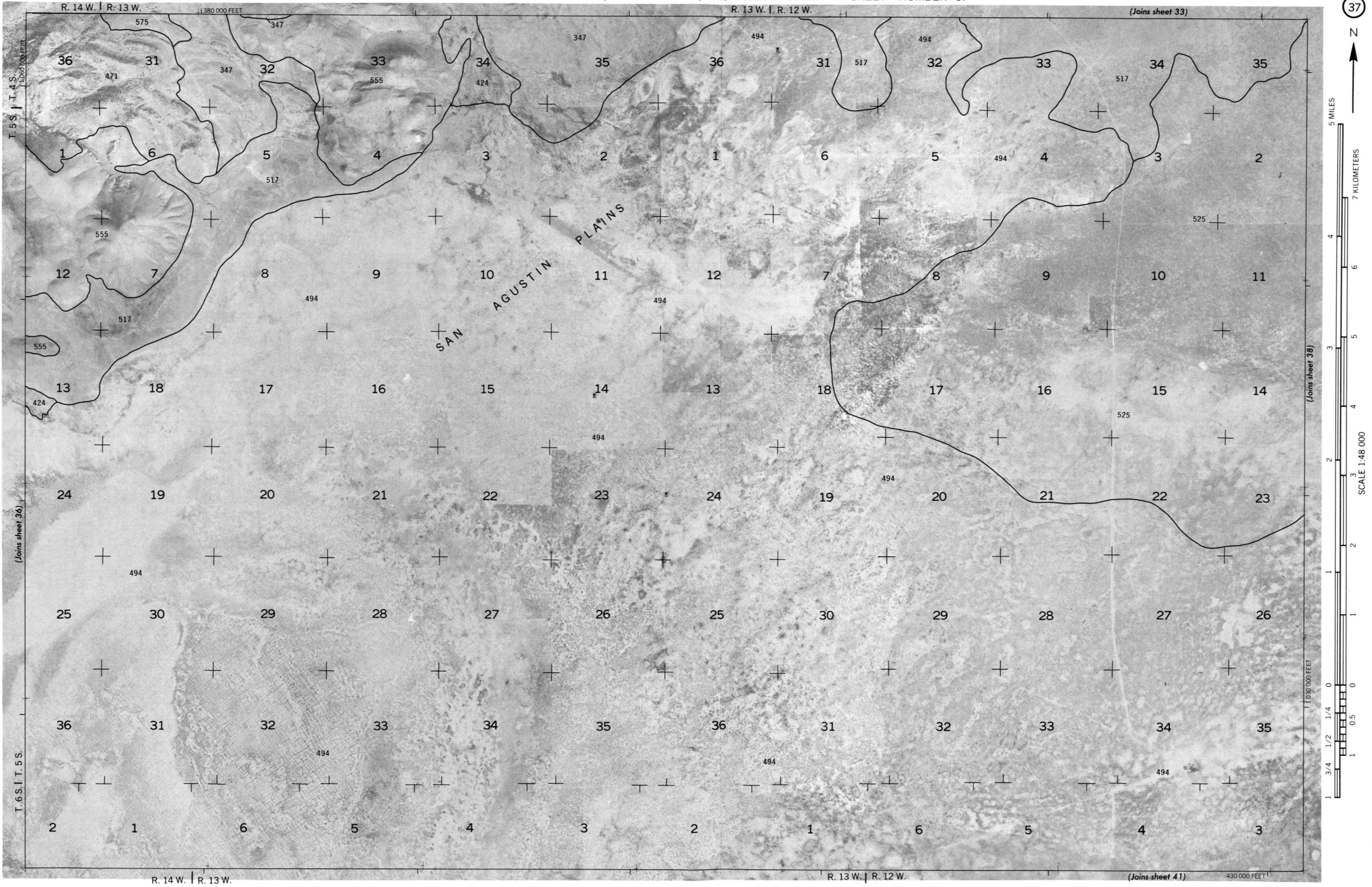
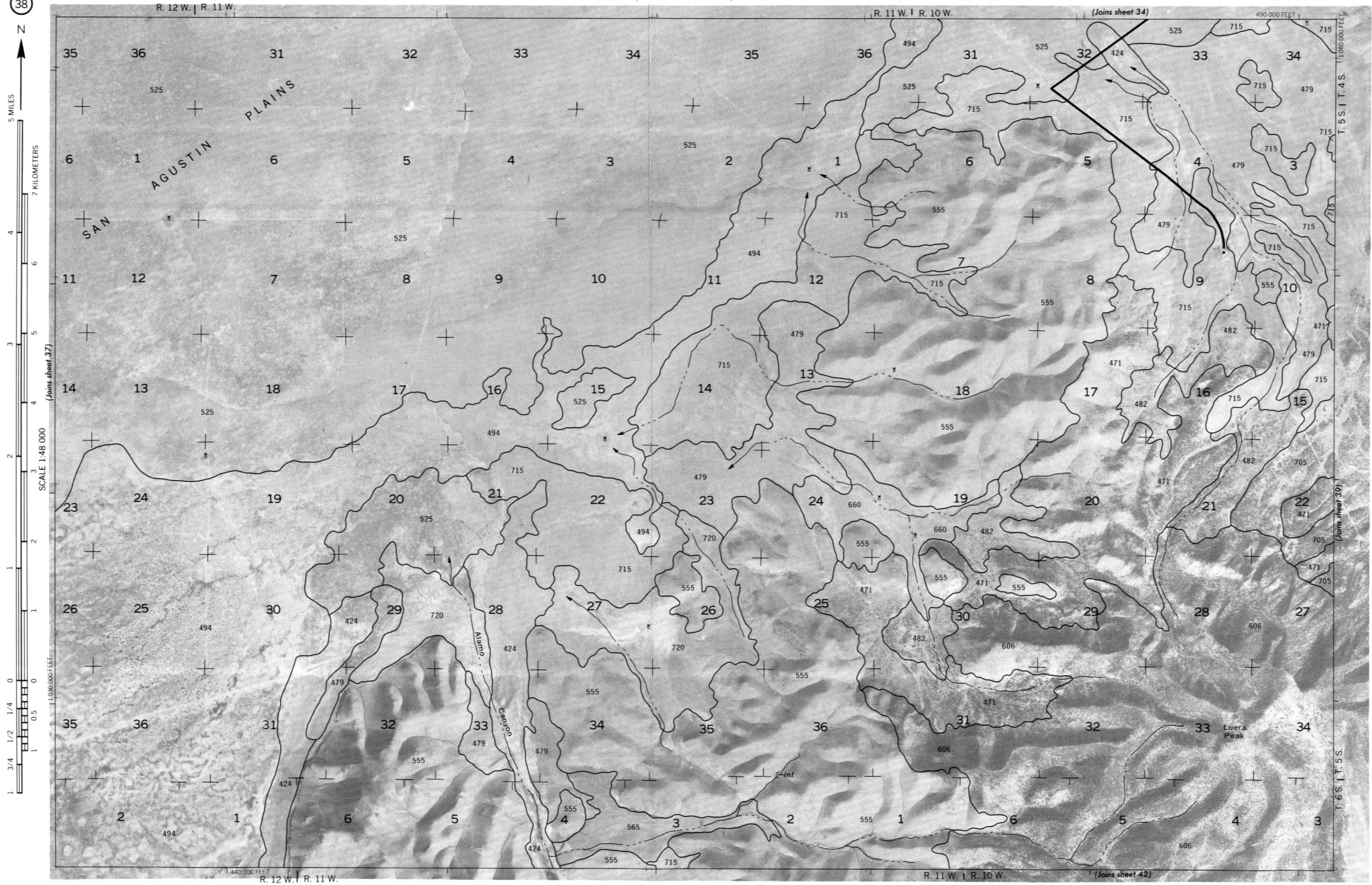
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 36



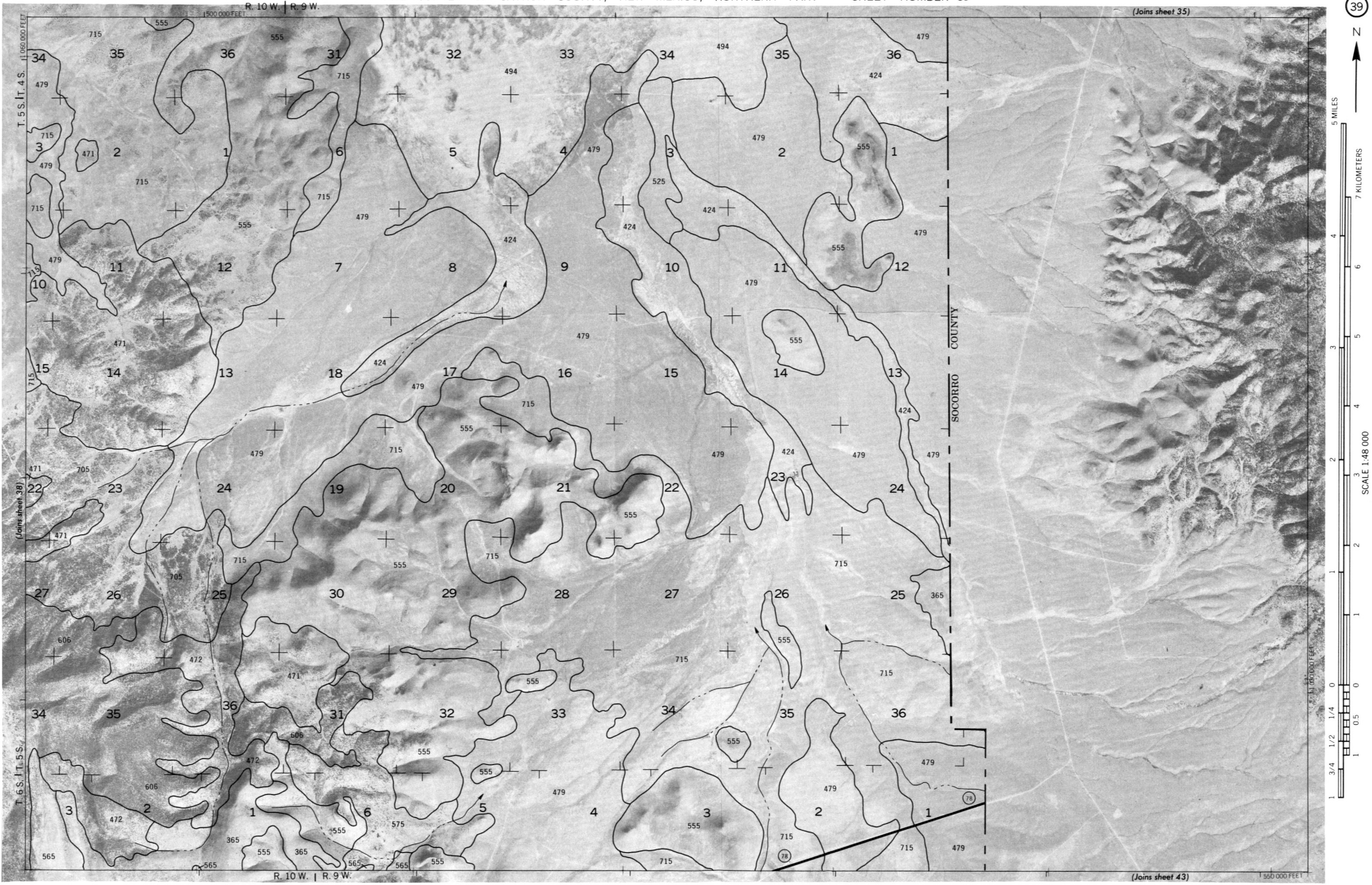
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 37

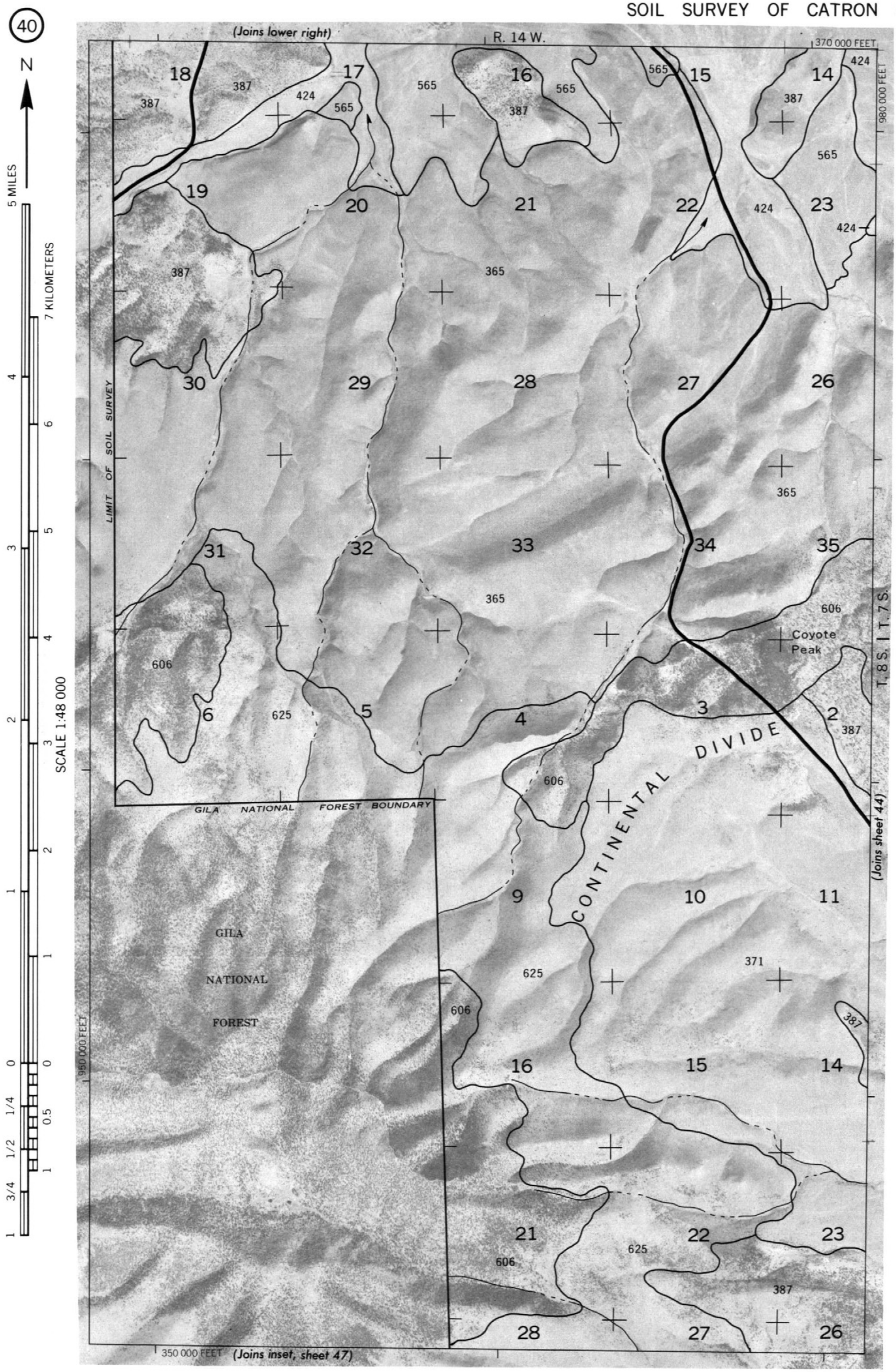


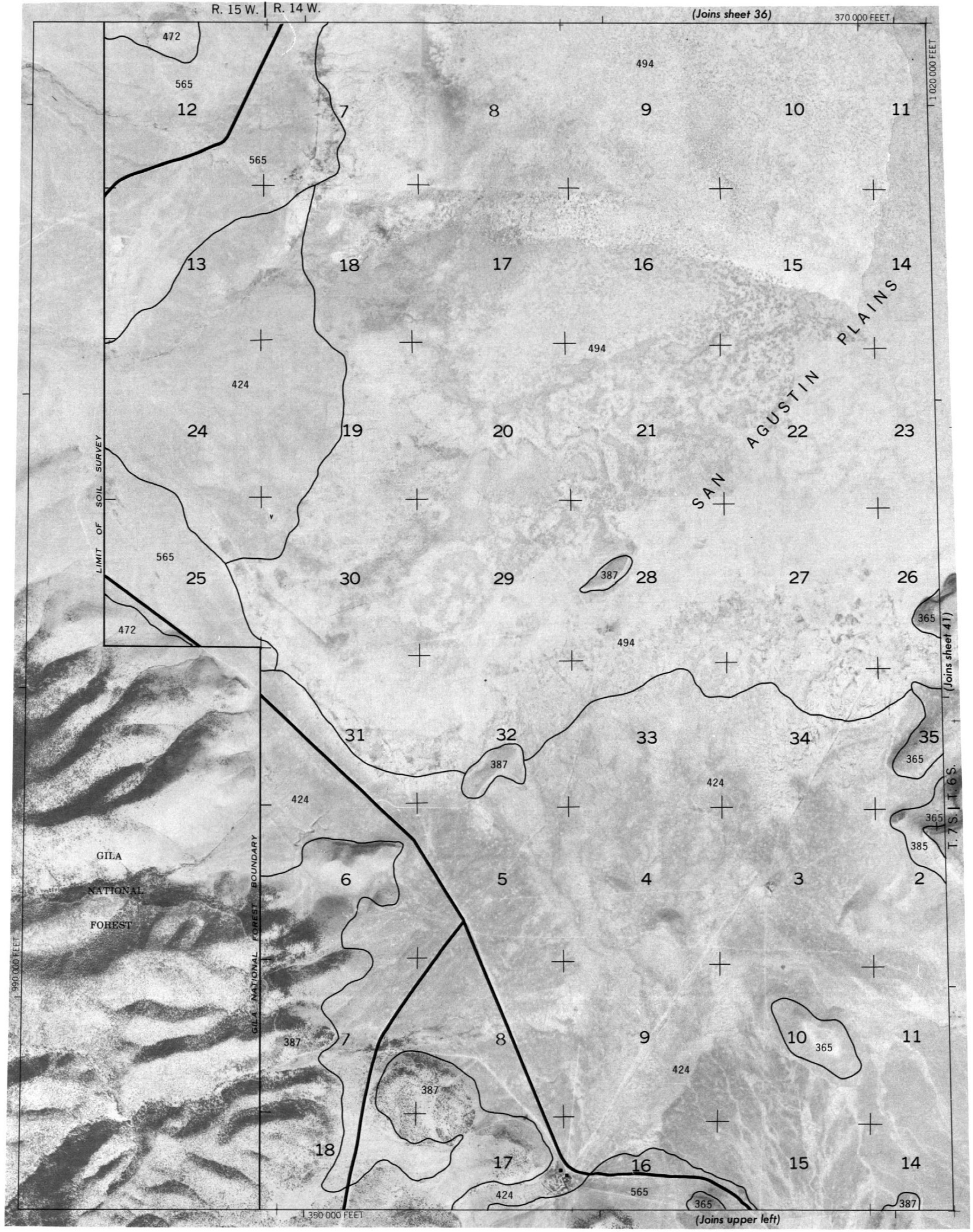
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 38



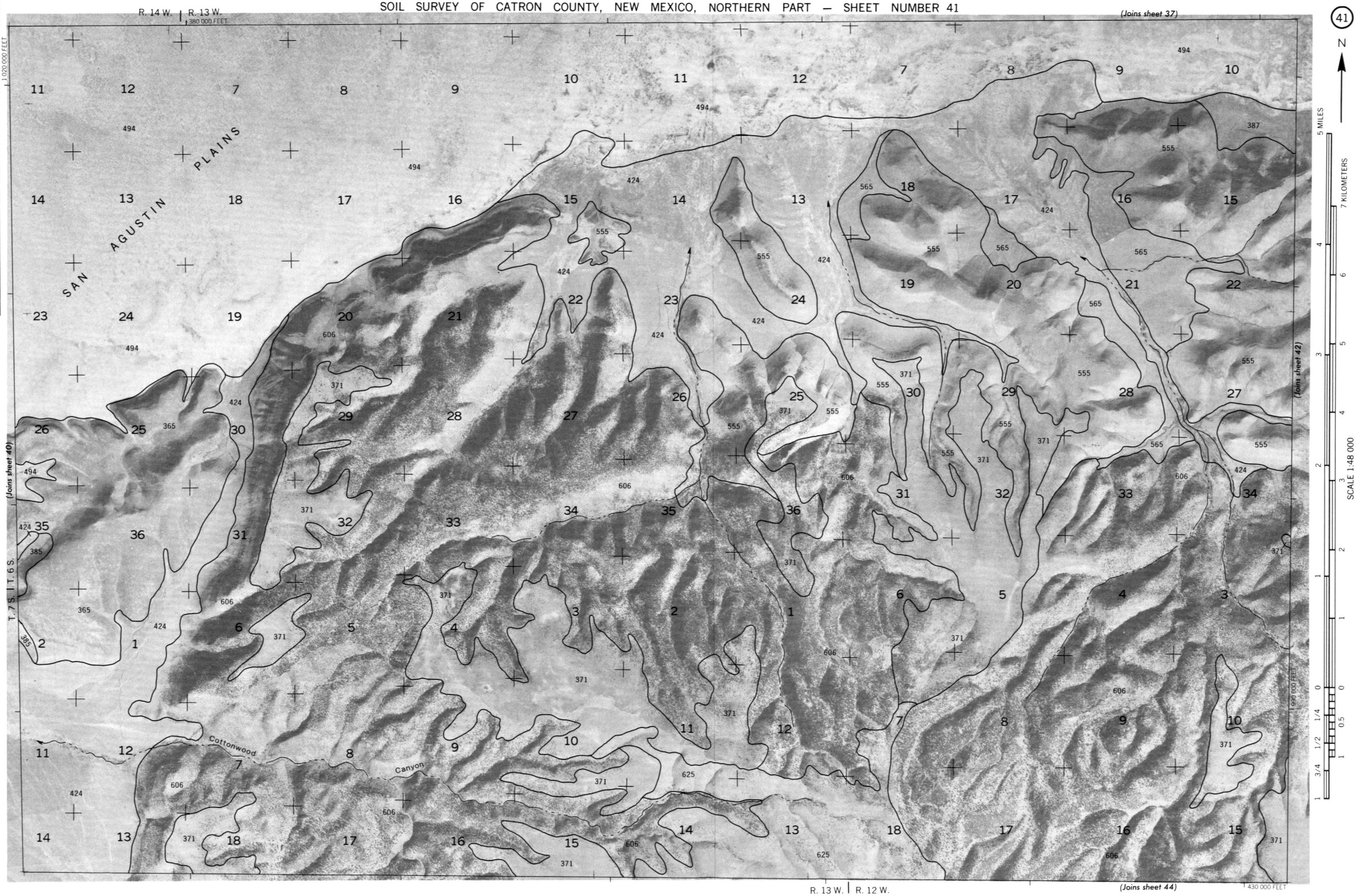
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 39



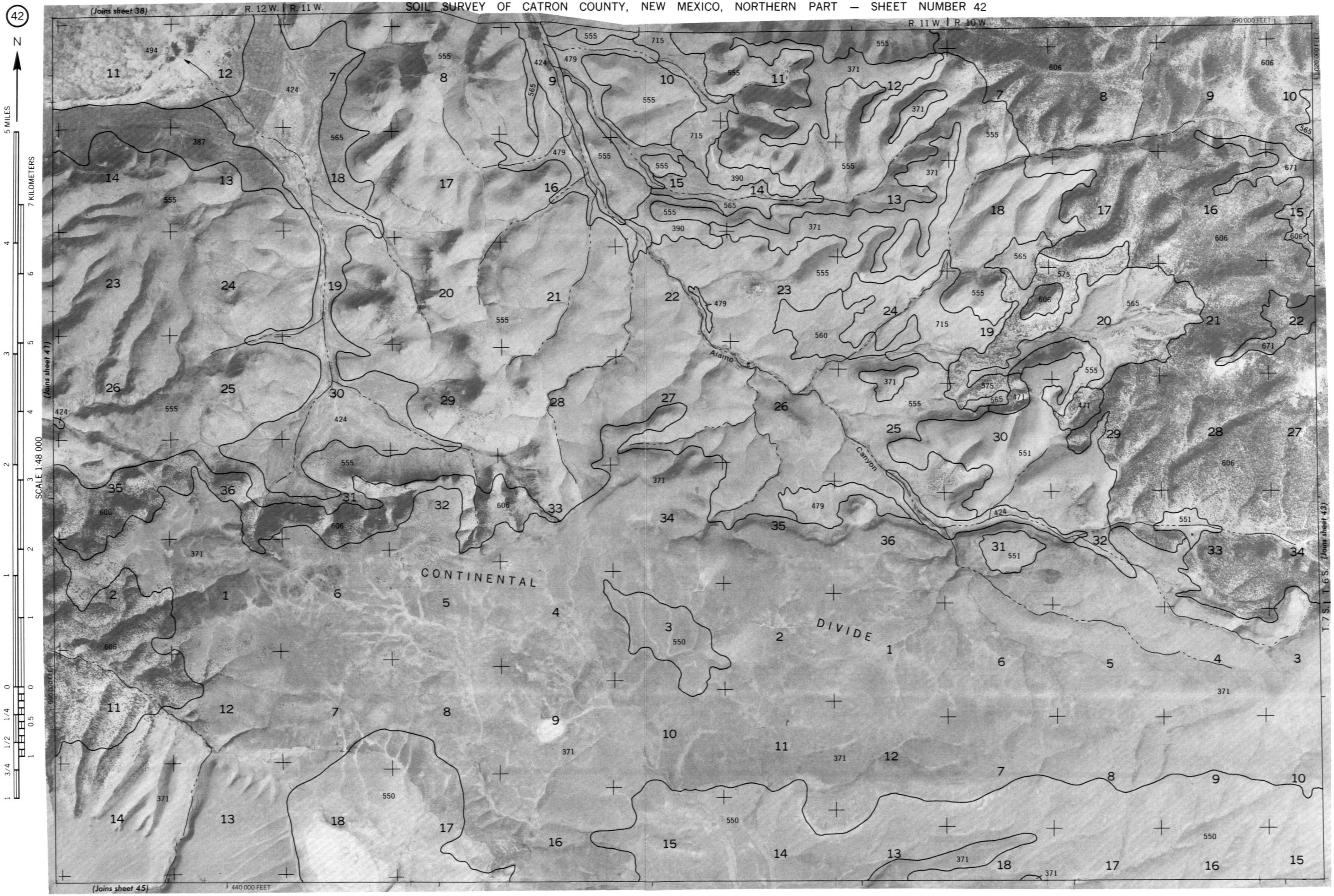

N
5 MILES
7 KILOMETERS
SCALE 1:48 000
(Joins lower right)
R. 14 W.
370 000 FEET
980 000 FEET
LIMIT OF SOIL SURVEY
GILA NATIONAL FOREST BOUNDARY
CONTINENTAL DIVIDE
Coyote Peak
T. 8 S. | T. 7 S.
(Joins sheet 44)
GILA NATIONAL FOREST
950 000 FEET
350 000 FEET
(Joins inset, sheet 47)
387
424
565
365
606
625
371


R. 15 W. | R. 14 W.
(Joins sheet 36)
370 000 FEET
1 020 000 FEET
SAN AGUSTIN PLAINS
LIMIT OF SOIL SURVEY
(Joins sheet 41)
T. 7 S. | T. 6 S.
GILA NATIONAL FOREST
GILA NATIONAL FOREST BOUNDARY
990 000 FEET
350 000 FEET
(Joins upper left)
472
565
494
424
387
365
385

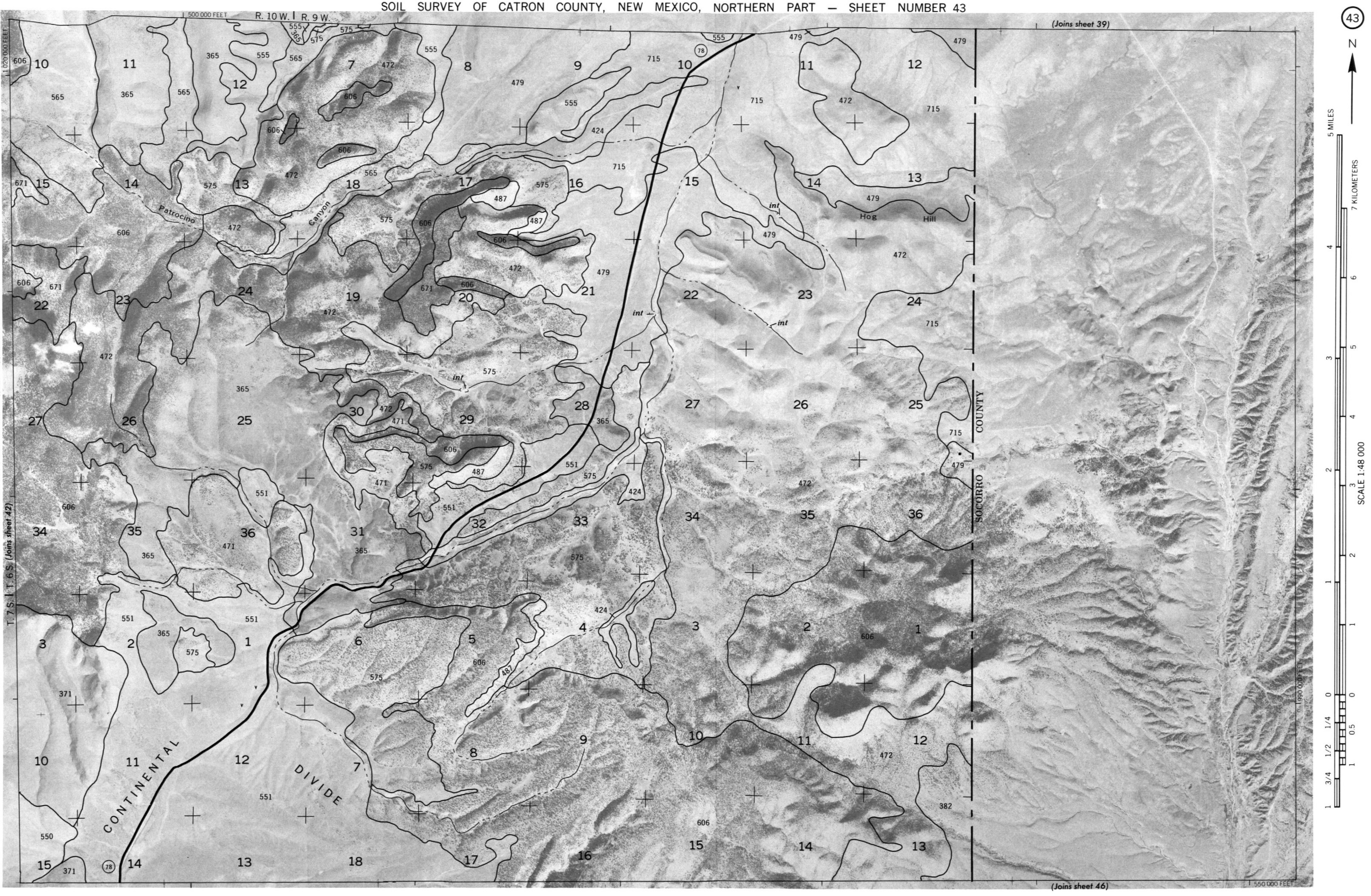
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 41



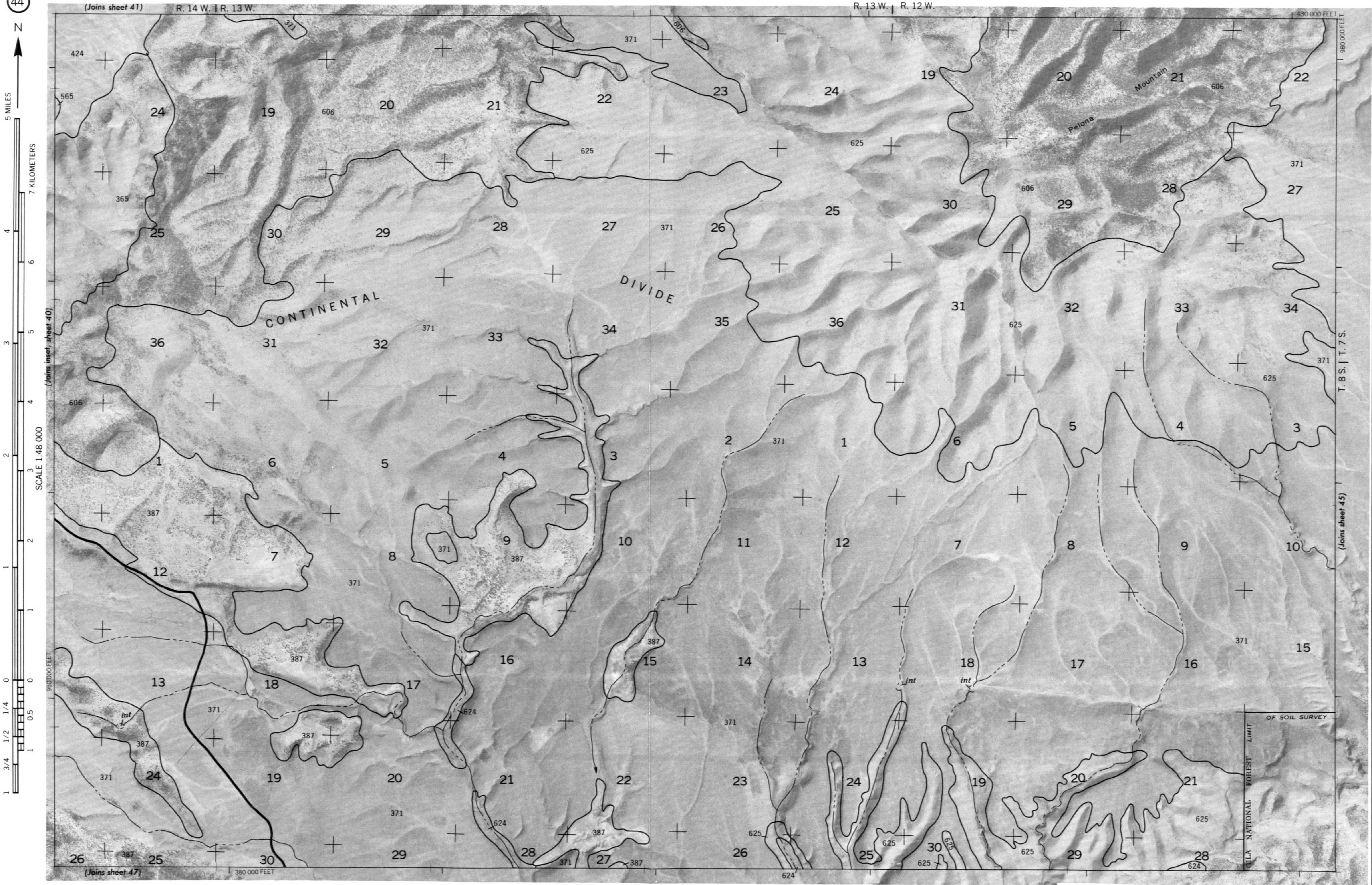
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 42



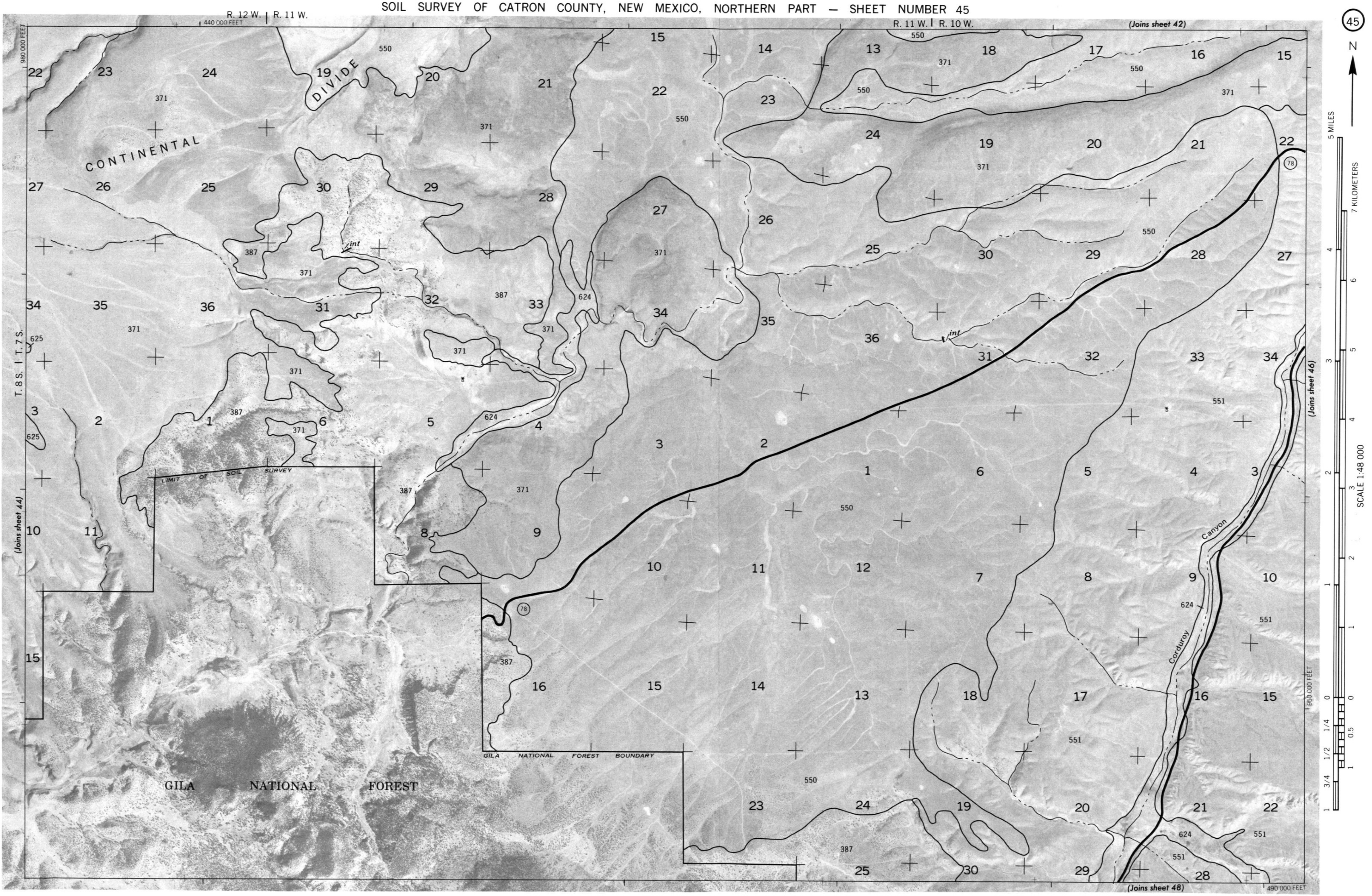
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 43



SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 44



SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 45



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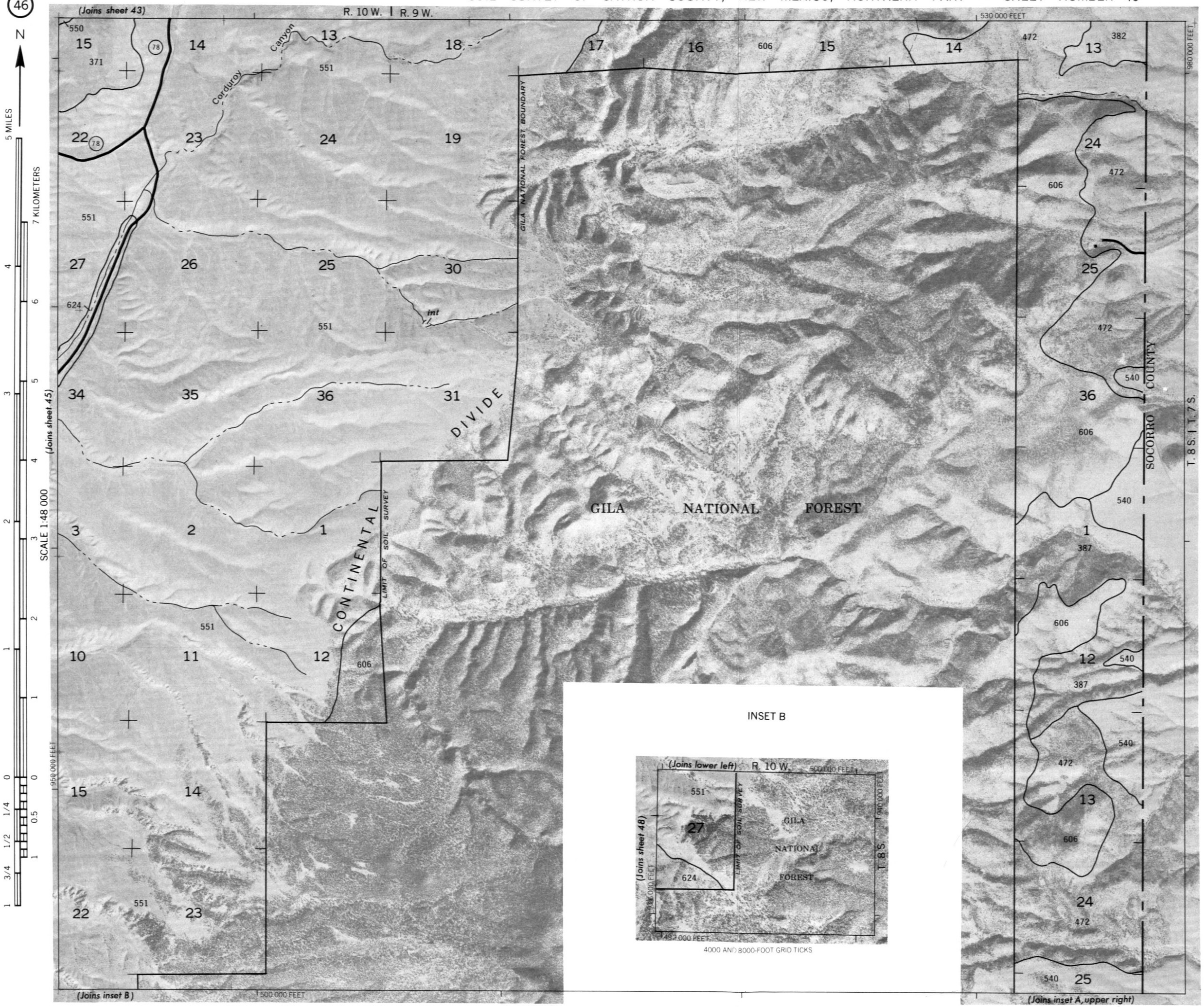
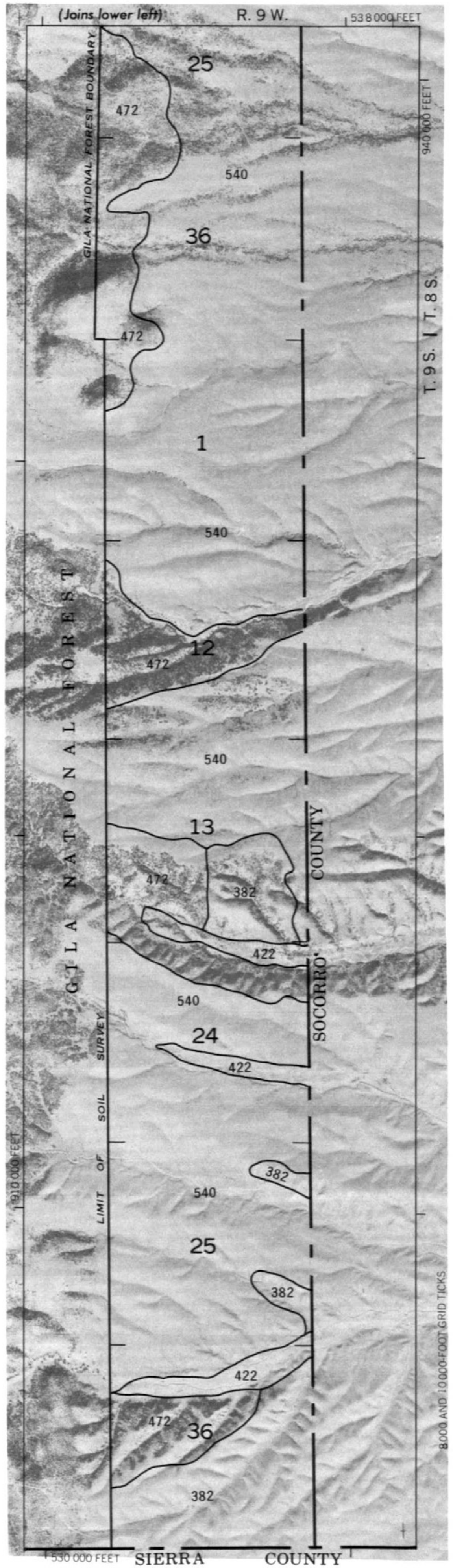
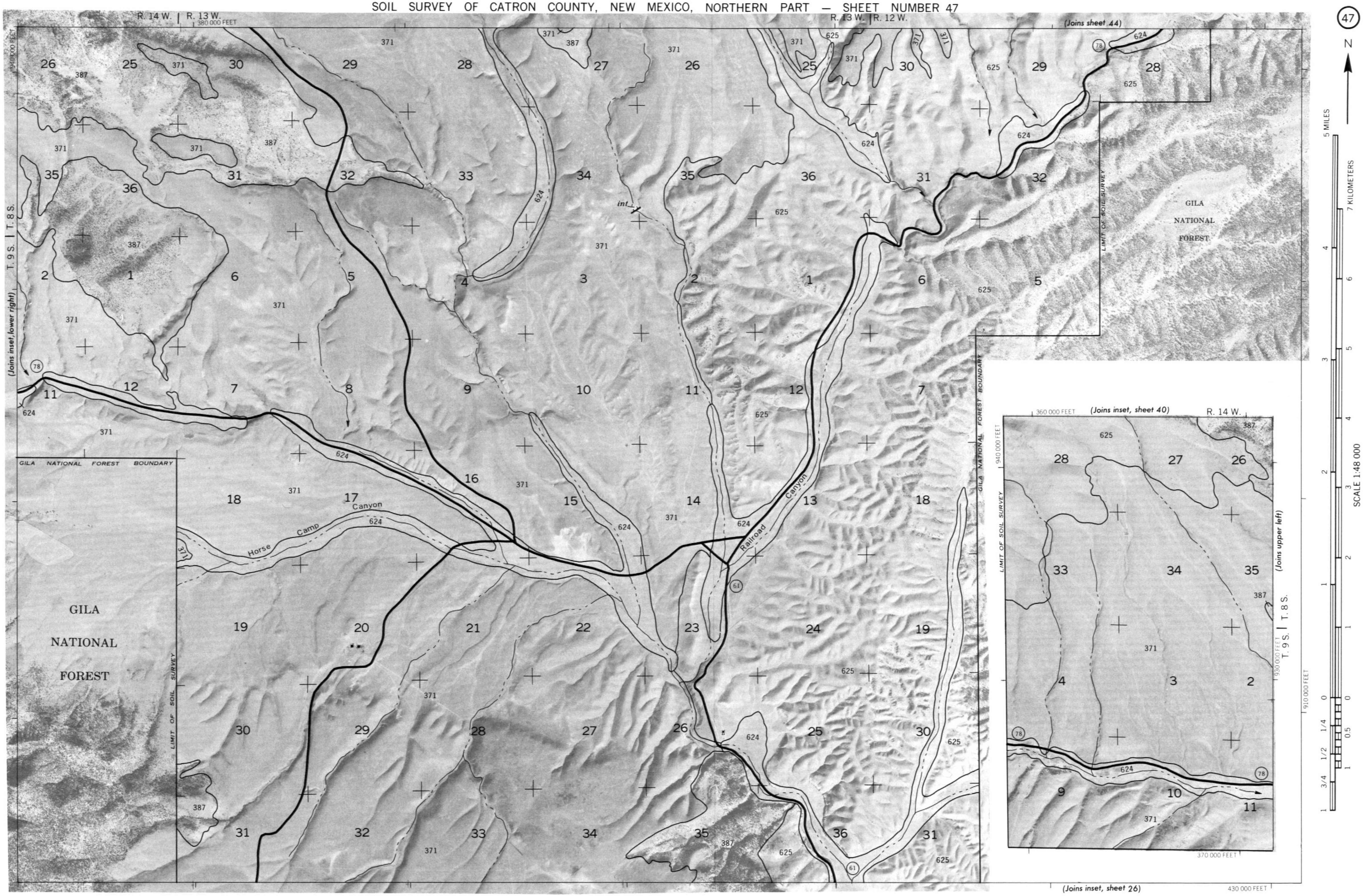
SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 46

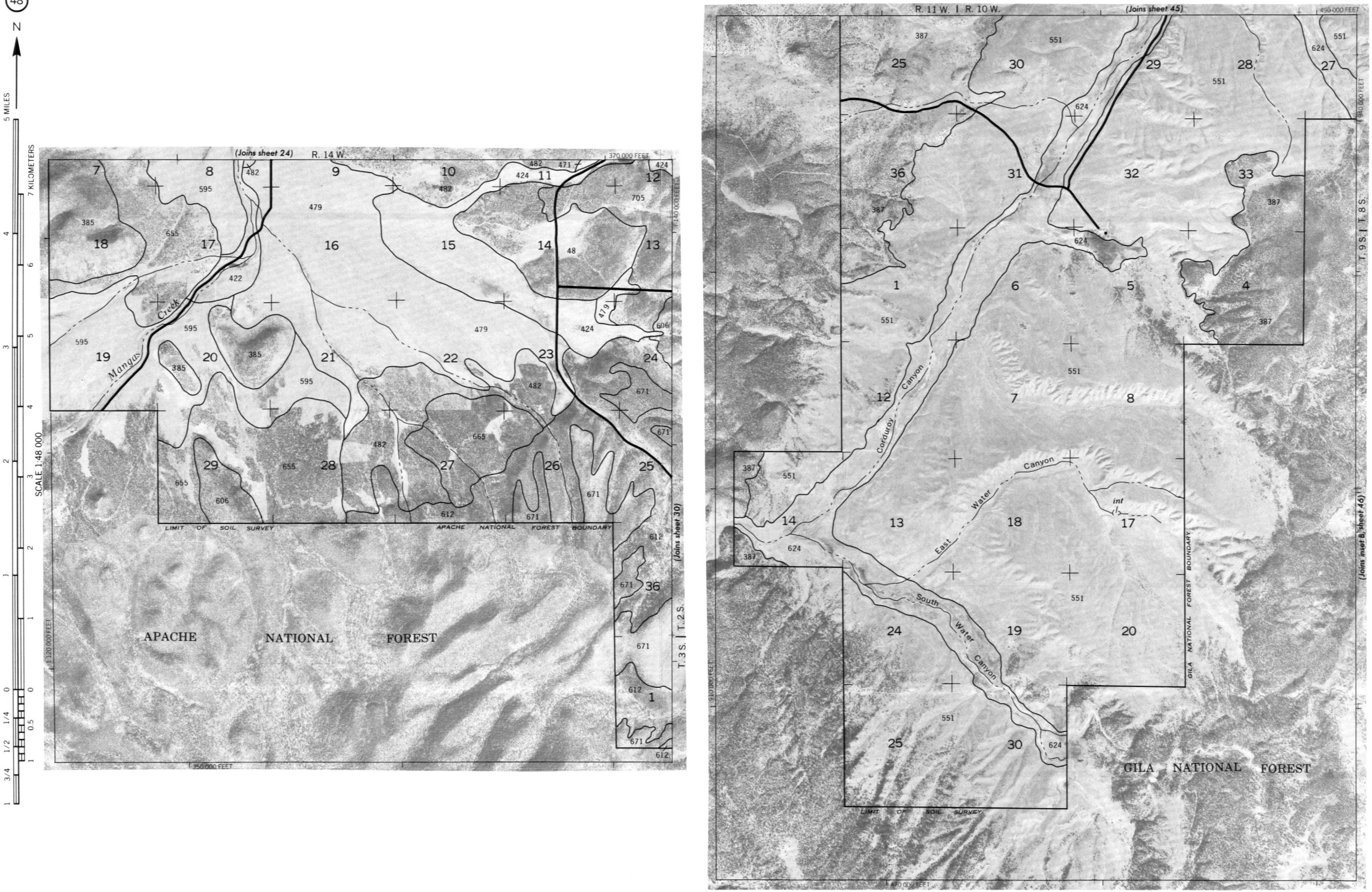


INSET A



SOIL SURVEY OF CATRON COUNTY, NEW MEXICO, NORTHERN PART — SHEET NUMBER 47




N
5 MILES
7 KILOMETERS
SCALE 1:48 000
(Joins sheet 24)
R. 14 W.
370 000 FEET
1 140 000 FEET
1 120 000 FEET
350 000 FEET
(Joins sheet 30)
T. 3 S. | T. 2 S.
Mangas Creek
LIMIT OF SOIL SURVEY
APACHE NATIONAL FOREST BOUNDARY
APACHE NATIONAL FOREST
385
595
655
422
479
482
424
471
705
48
606
671
665
612
(Joins sheet 45)
R. 11 W. | R. 10 W.
490 000 FEET
940 000 FEET
910 000 FEET
470 000 FEET
T. 9 S. | T. 8 S.
(Joins inset B, sheet 46)
Corduroy Canyon
East Water Canyon
South Water Canyon
int
GILA NATIONAL FOREST BOUNDARY
GILA NATIONAL FOREST
LIMIT OF SOIL SURVEY
387
551
624